REPORT RESUMES

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THE LANGUAGE OF THE CLASSROOM, MEANINGS COMMUNICATED IN HIGH SCHOOL TEACHING.

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A METHODOLOGY WAS DEVELOPED TO DESCRIBE THE LANGUAGE OF THE CLASSROOM BY CONSIDERING--(1) PEDAGOGICAL MOVES OF STRUCTURING, SOLICITING, RESPONDING, AND REACTING, (2) SUBSTANTIVE MEANINGS, (3) SUBSTANTIVE-LOGICAL MEANINGS, (4) INSTRUCTIONAL MEANINGS, AND (5) INSTRUCTIONAL-LOGICAL MEANINGS. A PROCEDURE WAS ALSO DEVELOPED FOR CHARACTERIZING THE OVERALL EMOTIONAL STYLE OF DISCOURSE UTILIZING THE CONCEPTS OF VALENCE, POTENCY OR STRENGTH, AND ACTIVITY. DATA WERE COLLECTED FROM A UNIT OF INSTRUCTION ON INTERNATIONAL ECONOMIC PROBLEMS PRESENTED BY 15 HIGH SCHOOL TEACHERS TO 345 STUDENTS IN SENIOR HIGH SCHOOL CLASSES. MEASURES OF KNOWLEDGE AND ATTITUDES WERE UTILIZED, AND THE FOUR CLASS SESSIONS COMPRISING THE UNIT WERE TAPE RECORDED IN EACH OF THE 15 CLASSES. CONTENT ANALYSIS OF TRANSCRIPTIONS REVEALED THE VARIOUS KINDS OF MEANINGS CONVEYED BY THE LINGUISTIC BEHAVIORS OF BOTH TEACHERS AND PUPILS. STATISTICAL ANALYSES WERE MADE OF THESE RESULTS. THE DATA REVEALED A CONSISTENT AND REMARKABLY STABLE PATTERN OF PEDAGOGICAL DISCOURSE. NO APPARENT RELATION WAS FOUND BETWEEN THE VALENCE, I.E., PLEASANTNESS OR UNPLEASANTNESS, OR THE MEANINGS EXPRESSED BY THE TEACHER AND SUBSEQUENT LEARNING OF THE PUPILS. IT WAS RECOMMENDED THAT SUBSEQUENT RESEARCH SHOULD CONSIDER THE CONSEQUENCES OF THE VARIABLES IN CLASSROOM LANGUAGE WHICH WERE DEFINED IN THIS STUDY. (JM)

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THE LANGUAGE OF THE CLASSROOM

Meanings Communicated in High School Teaching

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TABLE OF CONTENTS

ACKNOWLEDGMENTS iii

CHAPTER ONE: INTRODUCTION 1

The Language of the Classroom 2

Teaching and Learning 9

Summary 10

CHAPTER TWO: RESEARCH METHOD 11

Subject Matter for Instruction 11

Measures of Learning and Attitude Change 12

Subjects 16

Procedures 19

Analysis of the Protocols 22

Processing the Data 25

CHAPTER THREE: SYSTEM FOR ANALYSIS 26

Content Analysis System 26

Summary of Coding System 52

Coding of the Protocols 55

Reliability Test 58

Problems in Coding 60

Analysis of Emotional Meanings 63

CHAPTER FOUR: RESULTS 72

Teacher-Pupil Activity 73

Pedagogical Moves 78

Teaching Cycles 95
Substantive Meanings 103
Substantive-Logical Meanings 109
Instructional Meanings 114
Instructional-Logical Meanings 117
Test Results 123
Test Results and Classroom Discourse 128
Summary 141

CHAPTER FIVE: DISCUSSION 145
The Classroom Game 146
Basic Pattern of Pedagogical Discourse 158
Further Research 162

BIBLIOGRAPHY 169

APPENDIXES 171
A: Coding Instructions 171
B: Three-Page Excerpt From A Protocol 187
C: Test of Knowledge of International Trade, Attitude Scale and Revised Occupational Scale for Rating Socio-Economic Class 191

LIST OF TABLES

TABLE		PAGE
1	Number of Students, Average Vocabulary Score and Social Class Rating for Each Class and for All Classes Combined	18
2	Percentage of Agreement Among Coding Teams for Each Major Category in the Content Analysis	59
3	Percentage of Lines and Moves for Teachers, Pupils, and Audio-Visual Devices in Each of the Fifteen Classes	74
4	Teacher-Pupil Activity in Terms of Percentage of Lines and Moves by Session for Each of the Fifteen Classes and for All Classes Combined	77
5	Percentage of Lines and Moves in Each Pedagogical Category for Teachers and Pupils in Each of the Fifteen Classes and for All Classes Combined	79
6	Percentage of Moves Coded as Teachers' Solicitations, Pupils' Responses, and Teachers' Reactions	85
7	Average Percentage of Lines and Moves in Each Pedagogical Category for All Teachers Combined by Each Session and for All Sessions Combined	88
8	Average Percentage of Lines and Moves in Each Pedagogical Category for All Pupils Combined by Each Session and for All Sessions Combined	88
9	Percentage of Lines and Moves Devoted to Soliciting by Session for Teachers and Pupils in Each of the Fifteen Classes	89
10	Percentage of Lines and Moves Devoted to Responding by Session for Teachers and Pupils in Each of the Fifteen Classes	90
11	Percentage of Lines and Moves Devoted to Structuring by Session for Teachers and Pupils in Each of the Fifteen Classes	91
12	Percentage of Lines and Moves Devoted to Structuring-Assigned by Session for Pupils in Each of the Fifteen Classes	92
13	Percentage of Lines and Moves Devoted to Reacting by Session for Teachers and Pupils in Each of the Fifteen Classes	93

TABLE		PAGE
14	Percentage of Lines and Moves Devoted to Reacting-Underlined by Session for Teachers and Pupils in Each of the Fifteen Classes	94
15	Cycle Activity Indexes for Each of Fifteen Classes and for All Classes Combined	97
16	Percentage Distribution of Teacher-Initiated Cycles for Each of Fifteen Classes and for All Classes Combined	98
17	Percentage Distribution of Cycle Patterns for Each of Fifteen Classes and for All Classes Combined	101
18	Percentage of Lines and Moves in Each Substantive Category for Each of the Fifteen Classes, for All Classes and for All Categories Combined	105
19	Percentage of Lines and Moves in Each Substantive-Logical Category for Each of the Fifteen Classes, for All Classes and for All Categories Combined	110
20	Percentage of Lines and Moves in Each Instructional Category for Each of the Fifteen Classes, for All Classes and for All Categories Combined	115
21	Percentage of Lines and Moves in Each Instructional-Logical Category for Each of the Fifteen Classes, for All Classes and for All Categories Combined	118
22	Percentage of Lines and Moves in Each Category of Evaluative Reaction and Ratio of Positive to Negative Evaluations for Each of the Fifteen Teachers and for All Teachers Combined	121
23	Pre-Post Attitude Scale Scores, Pre-Post Knowledge Test Scores, and Pre-Post Score Differences for Each of the Fifteen Classes and for All Classes Combined	124
24	Comparison of Pre-Post Test Score Differences for Questions Related to Each Class' Most Frequently Discussed and Least Frequently Discussed Areas of Substantive Meaning	131
25	Average Rating on Valence Dimension of Emotional Meanings for Each Class and Each Session	136
26	Average Rating on Activity Dimension of Emotional Meaning for Each Class and Each Session	137
27	Average Rating on Strength Dimension of Emotional Meaning for Each Class and Each Session	139

CHAPTER ONE

INTRODUCTION

The purpose of this research was to study the teaching process through analysis of the linguistic behavior of teachers and students in the classroom. Observation of what goes on in elementary and secondary schools reveals that classroom activities are carried on in large part in verbal interaction between students and teachers; few classroom activities can be carried on without the use of language. This study, therefore, focused on language as the main instrument of communication in teaching. The major task was to describe the patterned processes of verbal interaction that characterize classrooms in action.

This research addressed itself specifically to description and analysis of the linguistic behavior of teachers and students in high school social studies classes. The subjects were 15 high school teachers and 345 students in classes studying a unit on "International Trade." The basic data were tape recordings and verbatim transcriptions of four class lessons for each of the 15 classes.

This chapter presents the theoretical view of classroom verbal behavior developed during this study which served as the basis for the system of analysis used to describe linguistic events in the classroom. The approach to the study of classroom discourse was influenced by recently developed concepts in the study of language and meaning by contemporary philosophers and psychologists including Wittgenstein (13), Feigl (4), Brown (1), and Osgood (8). The abstract, theoretical concepts from these sources were adapted, revised, and modified in the course of the work with the empirical data of classroom discussion. The task was one of working out the empirical referents of existing concepts and developing new concepts to describe significant characteristics of classroom discourse for which adequate concepts were not available.

THE LANGUAGE OF THE CLASSROOM

The study began with the common sense notion that verbal interaction in the classroom is a form of behavior. To observe students and teachers at work is to observe their performance of a great variety of verbal activities. Discussions are carried on, assignments are made, approval and disapproval are expressed, questions are raised and answered, debates and reports are presented -- all through the medium of words.

A Form of Social Behavior

The verbal actions typical of classroom discussion are of such a nature that they invite, encourage, and sometimes demand attention or an active response on the part of persons addressed. Questions are asked to be answered; assignments are made to be carried out; explanations are made to be understood. Clearly, the verbal activities involved in teaching are reciprocal affairs involving both teachers and students. It follows, therefore, that the role played by the teacher can be adequately described only in relation to the role played by students. To study the activities of teachers in the classroom without at the same time analyzing the actions of students would give a distorted and incomplete view of the teaching process.

The roles played by teachers and students are different, to be sure, and participants enter the classroom with roles more or less clearly defined. To identify the specialized functions of teachers and of students was one of the major tasks of this research. We were interested in finding out who (teacher or student) speaks, about what, how much, when, under what conditions, and with what effect. The study of the division of labor in the classroom was in terms of actual behavior or performance, rather than role expectations expressed by the participants.

Communication of Meanings

We began with the assumption that the primary function of language is the communication of meaning and that describing linguistic events in the classroom in terms of the meanings expressed by teachers and students was a potentially fruitful direction for research. Our conception of the nature of meaning was derived in large measure from Wittgenstein's view that "the meaning of a word is its use in the language." (13:20) Equation of meaning and use suggested that the problem was that of identifying the distinctive functions language actually serves in the verbal interplay between students and teachers and hence what meanings are conveyed through the words they use.

In searching for the meaning of what teachers and students communicate in the classroom, we found it helpful to identify (1) what the speaker was doing pedagogically with the words he spoke at a given time; (2) what he was saying (i.e., the content of his statement), and (3) the feeling tone or emotional meaning conveyed by the communication. That is, in analyzing the utterance of a teacher or student at a given point in class discussion, we were first of all concerned with the pedagogical significance of what the speaker was saying -- whether, for example, he was structuring the class discussion by launching or focusing attention on a topic or problem, eliciting a response from a member of the class, answering a question posed by a previous speaker, or reacting to a comment previously made. Second, we were interested in identifying the content of the communication -- what topic was the focus of discussion, what facts the question called for, what explanation was being offered, or what assignment was being made. Furthermore, in addition to the pedagogical function of the language and the particular content, we were concerned with both the explicit and implicit emotional aspects of the speaker's vocal expression. In brief, when we sought to determine the meaning of what students and teachers communicate in the classroom, we were concerned with _what_ the speaker (student or teacher) was saying, what he was doing _pedagogically_ in saying it, and the _feeling tone_ communicated by the way he said it.

An important methodological problem was that of devising the means whereby these dimensions of meaning could be defined operationally. In dealing with this problem, we were again influenced by Wittgenstein's approach to language. In his view, "the _speaking_ of language is part of an activity, or of a form of life" (13:11). Language is adaptable to many uses and functions in carrying on various types of activities that are essentially linguistic in nature. Wittgenstein referred to these activities as "language games," a metaphor used to point up the fact that linguistic activities assume different forms and structures according to the functions they come to serve in different contexts. A game has a definite structure, and there are certain moves that a player is bound to make insofar as he is playing the game at all. These are some of the verbal activities that he identified as language games (13:11-12):

Giving orders and obeying them
Reporting an event
Forming and testing a hypothesis
Play acting
Making a joke and telling it
Making up a story and reading it

Carrying the game metaphor a step further, Wittgenstein observed that verbal activities in various contexts follow certain rules or conventions appropriate to the activities underway. Learning to participate appropriately in various kinds of language activities is very much like learning to play a game. Players have to learn the rules, the purpose of the rules, and how the various parts of the game are related. Only by learning these rules can the game be played successfully. Similarly, successful communication in various types of linguistic activities depends on understanding the language-rules that govern the use of words in these activities.

Viewing classroom discourse as a kind of language game was a useful approach for purposes of this research, in that it suggested a framework of analysis within which the various dimensions of meaning could be defined in operational terms. Teaching is similar to most games in at least two respects. First, it is a form of social activity in which the players (teachers and students) fill different but complementary roles. Furthermore, teaching is governed by certain ground rules of play which guide the actions or moves made by participants. We reasoned that if we could identify the various types of verbal moves teachers and students make in playing the game of teaching and the rules they implicitly follow in making these moves, we would be in a position to investigate the functions these verbal actions serve in classroom discourse and hence the meanings that are communicated.

Examination of the transcripts of classroom discourse suggested that the verbal actions of students and teachers could be classified in four major categories. We labeled these basic verbal actions _pedagogical moves_ and classified them in terms of the pedagogical functions they perform in classroom discourse:

> _Structuring_. Structuring moves serve the pedagogical functions of focusing attention on subject matter or classroom procedures and launching interaction between students and teachers. They set the context for subsequent behavior or performance. For example, teachers frequently begin a class period with a structuring move in which they focus attention on the topic or problem to be discussed during that session.
>
> _Soliciting_. Moves in this category are designed to elicit a verbal response, encourage persons addressed to attend to something, or elicit a physical response. All genuine questions are solicitations, as are commands, imperatives and requests.
>
> _Responding_. These moves bear a reciprocal relationship to soliciting moves and occur only in relation to them. Their pedagogical function is to fulfill the expectation of soliciting moves. Thus, students' answers to teachers' question are classified as

responding moves.

Reacting. These moves are occasioned by a structuring, soliciting, responding, or another reacting move, but are not directly elicited by them. Pedagogically, these moves serve to shape or mold classroom discourse by accepting, rejecting, modifying or expanding what has been said previously. Reacting moves differ from responding moves, in that while a responding move is always directly elicited by a solicitation, preceding moves serve only as the occasion for reactions. Evaluation by a teacher of a student's response, for example, is designated a reacting move.

As we proceeded with the analysis of the data in terms of pedagogical moves it became evident that these moves occur in classroom discourse in certain cyclical patterns or combinations, which we designated teaching cycles. A teaching cycle begins either with a structuring or with a soliciting move, both of which are initiating maneuvers; they serve the function of getting a cycle underway. In contrast, responding and reacting moves are reflexive in nature; they are either solicited or occasioned by a preceding move and therefore cannot begin a cycle. A cycle frequently begins, for example, with a soliciting move by the teacher in the form of a question, continues with a responding move by the student addressed, and ends with an evaluative reaction by the teacher. A cycle might also get underway with a structuring move by the teacher in which he focuses attention on the topic to be discussed, continue with a question related to the topic, and end with responding moves by one or more students.

In focusing attention on the cyclical patterning of classroom discourse, the concept of teaching cycles made it possible to trace recurrent sequences in the verbal exchange among teachers and students and thus to describe the ebb and flow of the teaching process as it develops over time.

With the concepts of pedagogical moves and teaching cycles we were able to describe classroom discourse in terms of one of the dimensions of meaning with which this research was concerned -- meaning from the viewpoint of the pedagogical significance of what teachers and students communicate. But we were also interested in the dimension of meaning represented by the content of the messages communicated. Analysis of classroom discourse in terms of what teachers and students communicate revealed four functionally different types of meanings: (a) substantive with associated (b) substantive-logical meanings; and (c) instructional with associated (d) instructional-logical meanings.

Substantive meanings refer to the subject matter of the class; that is, specific concepts such as "multilateral trade" and generalizations involving, for example, the relations between specialization and the factors of production. Substantive-logical meanings* refer to the cognitive processes involved in dealing with the subject matter, such as defining, interpreting, explaining, fact stating, opining, and justifying. Instructional meanings involve such matters as assignments, materials and routine classroom procedures that are part of the instructional process. Instructional-logical meanings refer to distinctively didactic verbal processes such as those involved in positive and negative evaluating, explaining procedures, and giving directions.

---

*The system for the analysis of substantive-logical meanings draws on the research of Smith and Meux (9).

As we developed our techniques for analyzing classroom discourse in terms of pedagogical units, the initial plan was to develop parallel methods for determining the emotional meaning of each pedagogical unit. This aim, however, did not prove feasible; instead, a procedure utilizing larger time samples of the classroom discussion was developed. This provided a reliable basis for characterizing the overall emotional style of the discourse in terms of dimensions of meaning suggested by Osgood, Suci and Tannenbaum (8): (a) valence; (b) potency or strength; and (c) activity.

TEACHING AND LEARNING

In teaching, as in all practical activities serving human purposes, some criterion of success is needed if teachers are to know whether they are accomplishing what they set out to teach. The criterion of success for both teachers and students playing the game of teaching is evidence that the student participants have learned the desired skills and knowledge; learning on the part of students is the successful outcome or "upshot" of teaching. It is therefore important to distinguish learning as the outcome of teaching from the activity of teaching itself. Discussions about teaching and learning have been plagued by confusion between the two. The teacher's job is to teach students; he does not, indeed cannot, "learn" them.

Experience in carrying out this research has led us to recognize the importance of distinguishing the perspective from which the teacher in the classroom evaluates learning outcomes and the perspective from which a researcher interested in the consequences of classroom discourse might describe outcome variables. Without doubt, it is appropriate for the teacher to identify certain skills and knowledge that he feels his students should learn and then to judge the success or failure of his teaching on the basis of whether his students in fact do learn the desired skills and knowledge. But for research aimed at discovering relationships between linguistic variables in the classroom and subsequent learning outcomes, it is more appropriate to approach the problem of identifying the learning outcomes on the basis of observable consequences apart from any notion of what should be learned. It is, therefore, more useful for the researcher to raise the question, "What kinds of classroom events are related to what kinds of learning outcomes?" rather than the question, "What are the relationships between discourse variables and measures of learning based on some notion of what should be learned?" In other words, descriptive investigation of outcome variables is as significant as descriptive investigation of classroom discourse itself.

SUMMARY

The purpose of this research was to study the language of the classroom. We began with the assumption that the primary function of language is the communication of meaning and that describing linguistic events in the classroom was a potentially fruitful direction for research. Subsequent chapters of this report describe the methods and results of the research based on the theoretical viewpoints concerning the nature of classroom discourse presented in this chapter.

CHAPTER TWO

RESEARCH METHOD

The major aim of this research was to describe patterns of linguistic behavior of teachers and pupils in classroom discussion. A subsidiary aim, viewed primarily as an exploratory phase of the general line of research, was to study linguistic variables of classroom discourse in relation to subsequent pupil learning and attitude change. To accomplish these aims, the research procedure included the following steps: (1) selection and analysis of a unit of instruction; (2) development of measures of learning and attitude change; (3) collection of data, involving pre- and post-measures of knowledge and attitudes plus recordings and transcriptions of classroom discussions; (4) development of a system of content analysis dealing with the several kinds of meanings conveyed by the linguistic behaviors of teachers and pupils; and (5) application of statistical methods for an analysis of the results.

SUBJECT MATTER FOR INSTRUCTION

In order to establish some reasonable limits within which the groups of students and teachers could conduct their classroom work and to provide a relatively stable basis both for testing changes in knowledge and for analyzing the substantive meanings of the classroom discussion, a specific unit of instruction was selected for all classes participating in the research. This unit was based on the first four chapters of the pamphlet International Economic Problems by Dr. James D. Calderwood (2).

Beginning with a general definition of trade and an explanation of the reasons for trade, the pamphlet discusses the differences between domestic and international trade, problems of foreign investments, imports and exports, various kinds of trade barriers and reasons for such barriers, and then focuses on the reduction of trade barriers, arguments for and against international trade barriers, and some current methods for reduction of tariffs and other barriers.

This pamphlet was selected for several reasons. It provides a clear and generally excellent exposition of a delimited amount of substantive material at a level of difficulty appropriate to the senior high school classes which were sampled in the main study. The problems discussed were also of current public interest.

Before collecting the data to be considered in the final analysis, a member of the project staff taught the instructional unit to two high school classes similar to those that participated in the major part of the research. In general, the information obtained in this preliminary work supported the assumption that the unit was appropriate for the purposes of the research.

MEASURES OF LEARNING AND ATTITUDE CHANGE

In this section, the testing instruments used in the present study - a subject matter examination, an attitude scale, and a test of verbal intelligence - are discussed.

Test of Knowledge

To evaluate students' prior knowledge and to obtain an estimate of the amount of learning that occurred during the experimental period, the staff developed a test of knowledge related to the substantive material of the instructional unit. This test was based on a detailed analysis of the material covered in the pamphlet which served as the basis of the instructional unit. Moreover, the specific logical processes required by the test and the particular substantive items covered were selected to parallel the content analysis of logical and substantive meanings contained in the classroom discourse. Thus specific logical and substantive aspects of the classroom discourse, such as definitions of tariffs, quotas, and other types of trade barriers, could be related to a measure of the amount of learning related to each of these topics.

The test, designed in short essay form, included three sections. Section One deals with connotative and denotative definitions of ten significant terms used in the pamphlet for the discussion of international trade; for example, one item concerns the term specialization. The student is required first to write a general definition of specialization as the term is used in discussions of international trade, giving the major ideas or characteristics to which the term refers; then, the student is asked to give a specific example to illustrate the concept of specialization.

Section Two of the test concerns a knowledge of general principles related to explanations of various economic phenomena or the justification of economic policies. The student, for example, is asked to answer briefly the following question: "Why is the largest amount of international trade between highly industrialized countries?" In each case, the student is instructed simply to write the main idea or major points in answering each question, without going into much detail.

Section Three parallels the general items contained in the second section, but requires the students to apply their knowledge of economic principles by explaining concrete instances involved in international trade or justifying particular trade policies. Paralleling the item cited above to illustrate the previous section, the question asked in Section Three was: "Burmese farmers desperately need American farm equipment and other American goods. Yet, there is relatively little trade between Burma and the U. S. today. Why?"

The time required for administration of the test was 40 minutes: 10 minutes for Section One, and 15 minutes each for Sections Two and Three. To eliminate the effect of order of items in each section, which might have played a significant role under the rather short time limits, two forms of the test were used. The two forms contained identical items, but within each section of one form the order of the question was the reverse of that contained in the alternate form. For example, the first item in Section One of Form A asked for a definition of the term specialization, while in Form B, this item was the last question in the section. Half the students in each class received each form, thus providing some control for differences in time that might be spent on a given item as a function of its place in the order of questions.

A comprehensive and detailed key was prepared for scoring. The key, based primarily on the information contained in the instructional pamphlet, contains explicit rules and examples for evaluating the answers to each question. Each section was allotted a total weight of 20 points, two points assigned to each of the ten items in a section. Reliability of scoring was estimated by comparing total scores of 43 tests scored independently by two judges. A product-moment correlation of .84 was obtained between the scores assigned by the two judges, indicating a degree of interjudge reliability sufficiently high for purposes of this research. A copy of the test is included in Appendix C.

The Attitude Scale

A subsidiary aim of this study was to explore the relationship between various aspects of classroom discourse and students' attitudes toward studying economics. A seven-point scale was developed to measure these attitudes, and the student was asked to check the statement which best described how he felt about studying economics. In an early form of the scale, statements ran from very positive to very negative attitudes, but in a preliminary study the data showed that very few students checked the more negative points on the scale. For research purposes, therefore, the clearly negative statements had little functional value and, in fact, decreased the possible discriminative value of the scale. Thus, the final form of the scale ran from a very positive to a relatively neutral attitude. The statement reflecting the most positive attitude was:

> Studying economics is of tremendous value, and I'd really enjoy it. It is one of the most important subjects I know, and everyone should be required to study it.

The statement reflecting the least positive attitude was:

> Studying economics won't do anybody any harm. I haven't any definite like or dislike for this subject. It might be worthwhile if it were taught right.

Between these two extremes were five statements reflecting varying degrees of favorableness toward the study of economics. Although it cannot be assumed that the seven points on the scale represent equal intervals, the results of preliminary research in the development of the scale, involving an investigation of the relative favorableness of each statement, lend credence to the assumption that the scale validly reflects a rank order of positive to neutral attitudes about studying economics. A copy of the scale is contained in Appendix C.

Verbal Intelligence

An estimate of verbal intelligence of the students was obtained by means of a 40-item vocabulary test developed by Thorndike (10). It is a relatively brief measure of verbal ability, but previous research indicates a rather high reliability and concurrent validity in terms of substantial correlations with other group measures of intelligence.

SUBJECTS

The original plan for the research called for an analysis of discourse in 15 classes. Anticipating some drop outs, data were collected in a total of 19 classes. Because of illness of one teacher during the period of data collection and technical difficulties of recording in other classes, the final sample included 15 classes as originally planned.

The sample consisted of 10th and 12th grade students enrolled in problems of democracy classes in seven high schools in the metropolitan and suburban area of New York City. For purposes of the study, each teacher taught one class, and the instructional unit was included in the regular course schedule. Table I provides a summary of the data describing characteristics of each class.

The number of students for each class, as shown in Table I, is based on the number of students who took both the pre-tests and post-tests, and therefore does not include absentees. Informal observations during the data collection, however, suggested relatively few absentees. As may be seen in Table I, there was a considerable range in the size of the classes, with 15 for Class 12 and 34 for Class 2, and a mean of 23 pupils per class. Average vocabulary score ranged from 23.4 in Class 6 to 35.7 in Class 12, with a mean of 27.1 (perfect score, 40). Thus, there was considerable interclass variability in verbal intelligence, although the results indicate that the distribution of ability among the students was skewed somewhat positively toward the upper range in comparision to various national samples; for example, in terms of a voting sample obtained by Thorndike and Gallup (11), the average score in the present sample falls in approximately the 70th percentile. Perhaps more important than the average score, however, is the wide range of scores, which permits an analysis of the data both for learning and classroom discourse in relation to differences in verbal ability.

Estimates of socio-economic class status, based on parent's occupation, were obtained by means of a seven-point scale of occupational ratings developed by the Horace Mann-Lincoln Institute of School Experimentation, Teachers College, Columbia University (5). In the present sample, social class ratings ranged from 1.8 for Class 10 to 4.0 for Class 3, with a mean of 3.0. Occupations in level 3, the approximate

TABLE 1

NUMBER OF STUDENTS, AVERAGE VOCABULARY SCORE AND SOCIAL CLASS RATING FOR EACH CLASS AND FOR ALL CLASSES COMBINED

Class	Number Students in Class	Average Vocabulary Score	Average Social Class Rating
1	25	25.1	3.8
2	34	27.0	2.7
3	18	26.8	4.0
4	30	27.0	3.2
5	29	25.4	2.8
6	20	23.4	3.5
7	23	27.2	2.9
8	20	30.0	2.7
9	28	30.0	3.2
10	16	31.4	1.8
11	23	26.2	3.2
12	15	35.7	2.0
13	22	25.3	3.2
14	20	26.1	2.9
15	22	24.2	3.5
$\bar{X}$	23.1	27.1	3.0

mean of the sample, include social workers, librarians, commercial artists, office managers, auto salesmen, detectives, and administrative secretaries. These, of course, represent only examples of occupations classified at this level, and a copy of the scale, with representative occupations at each level is included in Appendix C.

PROCEDURE

Several weeks before a class participated in the actual study, a member of the research staff met with members of the administration of each school and the cooperating teachers. The aims of the project were discussed in general terms and the procedure was described. Teachers were told that the major purpose of the study was to develop a method of describing the language of the classroom. They were given copies of the pamphlet on international trade, as well as a teacher's guide paralleling the material in the pamphlet, and were asked to base their unit of instruction during the experimental period on the subject matter contained in the first four chapters of the pamphlet.

The procedure involved (1) pre-test; (2) the experimental class sessions; and (3) post-test. In most instances, the pre-test was administered on the Friday before the week in which the class participated in the experimental instruction. In a few instances, because of scheduling problems, the pre-test preceded the experimental sessions by a somewhat longer period, but this period was in no case longer than six days. During the pre-test session, both the test of knowledge and the attitude scale were administered.

The four experimental class sessions usually met Monday through Thursday of a given week, although a few classes deviated from this pattern because of conflict with other aspects of the school program. In all cases, however, the experimental sessions involved four successive meetings of the class. Teachers were instructed to use whatever methods they normally followed in class, emphasizing the goal of describing "normal" classroom discourse with minimal external interference. Realizing that the presence of a tape recorder and the teachers' and students' knowledge that they were participating in a research study would probably influence their behavior, instructions were designed to minimize this interference. The instructions to the teachers, for example, reassured them that the research did not involve an evaluation of their performance and that complete anonymity would be maintained. Observations during the data collection and subsequent analyses of the data indicated a remarkably high degree of cooperation both from teachers and from students. Although it cannot be assumed that the research procedures had no effect on the classroom behavior, it seems reasonable to conclude that this effect was minimal.

During the last few minutes of the fourth experimental class session, the pamphlets were collected from the students and the post-attitude scale was administered. At the next meeting of the class, which typically was the following day, the post-test of knowledge of subject matter was administered.

Recording the classroom discourse involved the use of two microphones, one to record the teacher's speech and the other placed among the students to record their discussion. In the first few classes studied, the teacher's speech was recorded by means of a nondirectional microphone placed on the teacher's desk, but it was later found that a microphone worn by the teacher provided somewhat better fidelity. According to the teachers' reports this did not interfere with their work. Subsequent classes, therefore, were recorded by means of a microphone worn by the teacher and a microphone placed among the students, both of which were fed into a Switchcraft 301 TR mixer which was in turn connected to a T-1500 Wollensak tape recorder. The tape recorder, placed at the side of the classroom, was operated by a technician attached to the project staff.

Typescript protocols of the tape recordings were prepared. These typescripts were then revised by a second person who audited the tape recording and made whatever corrections and additions were necessary. At this point, over 95 per cent of the classroom discussion was transcribed, but as a further check on accuracy of the transcriptions, the recordings were audited once again when the protocols were analyzed. In the final analysis, probably no more than three or four per cent of the classroom discussion was missed, and this material primarily involved instances in which several students spoke simultaneously for very brief periods of time.

ANALYSIS OF THE PROTOCOLS

The content analysis system and the method used to obtain ratings of emotional meaning will be described in some detail in Chapter Three of this report, but it may be worthwhile at this point to report briefly the development of the categories of analysis and the general procedures for describing the various kinds of meaning contained in a protocol of classroom discourse.

The initial research plan called for an analysis of the content of classroom discourse in terms of substantive and substantive-logical meanings. At the outset, it was assumed that the basis for this analysis would be the material presented in the pamphlet on international trade. For the most part, this assumption was supported by the analysis of substantive and substantive-logical meanings. As the data were collected, however, two major problems became apparent: (1) before classifying the discourse in terms of substantive and substantive-logical meanings, a unit of discourse had to be defined; (2) material related to classroom activities, but substantively different from the specific subject matter of international trade, obviously was contained in the discourse and could not reasonably be omitted from the analysis. Such material, for example, concerned assignments, teachers' reactions to student behavior, and other statements related to the process of instruction.

Solution of the first problem, the definition of a unit of analysis, turned out to be one of the most promising aspects of the entire analysis. The classroom discourse is viewed as a language game, following the theoretical framework proposed by Wittgenstein (13), and the unit of discourse is defined as a pedagogical move. As indicated in Chapter One, these moves are classified into four major categories, structuring, soliciting, responding, and reacting, and each move is conceptualized in terms of its pedagogical function in the discourse. Each of these categories will be defined more fully in subsequent sections of this report, but the important point to note here is that this relatively simple system of classification serves as a highly reliable basis for coding and describing the flow of classroom interaction in terms that have considerable apparent pedagogical use and functional meaning.

Solution of the second problem, involving material other than that specifically presented in the pamphlet upon which the teaching unit was based, required a major extension of the original plan of analysis. As indicated, the content of classroom discussions was originally to be analyzed primarily from two points of view, the logical and the substantive. Substantive meanings included definitions, facts, and principles of economics relevant to a discussion of international trade. In a sense, this would be the subject matter of instruction as viewed from the role of an economist. It soon became apparent, however, that the teacher, and to some extent the students, not only played the role of an economist discussing trade, but also played a variety of pedagogical roles. The teacher made assignments, specified classroom procedures to be followed, evaluated the appropriateness of student behavior; the students, in turn, asked questions about procedures, reacted to each other's behavior, and commented about the value of the pamphlet and about other material. These statements were clearly different from those one might make strictly from the point of view of economic analysis. Recognition of the discourse related primarily to the instructional meanings and the associated instructional-logical meanings in effect, doubled the number of categories.

Development of the code for analysis was a long and detailed process requiring the interaction of several researchers who constantly reviewed and revised successive approximations of the final code in the light of actual protocols. This provided an immediate empirical check for the more abstract concepts of analysis that gradually emerged in the course of the work. This daily encounter between relatively abstract, theoretical concepts of meaning and the empirical data of the classroom discussions provided a fruitful and realistic means of developing the system of analysis.

After revision, modification, and refinement of the coding system, the final analysis of the material was begun. Even at this stage of the research, however, further revisions of the code were necessitated by problems encountered in particular protocols. On several occasions, all of the protocols analyzed on the basis of a previous draft of the code had to be reanalyzed to account for new revisions in the rules of analysis. Although this procedure appeared to be somewhat inefficient in terms of the expenditure of time and effort, experience demonstrated that, within the limitations of current knowledge about the teaching process, this was the only way one could do justice to the extraordinarily complex interactions contained in the classroom discourse.

CHAPTER THREE

SYSTEM FOR ANALYSIS

The preceding chapter reported the development of the categories of analysis and procedures for describing the various kinds of meanings communicated in the classroom. This chapter presents the content analysis sytem devised to describe the verbal performance of teachers and students and the methods used to obtain ratings of emotional meaning conveyed by the vocal aspects of teachers' speech. In addition, procedures followed in describing classroom discourse using the system of analysis are illustrated with several excerpts from the coded protocols and results of the formal test of the reliability of the system are reported.

CONTENT ANALYSIS SYSTEM

The system presented in this section is in three parts: Part One presents the basic categories of analysis; Part Two discusses in detail pedagogical moves and teaching cycles; and Part Three is concerned with the categories of meaning communicated in the classroom.

Part One: Basic Categories of Analysis

Basic categories of analysis include types of pedagogical moves, teaching cycles, and various categories of meaning. This section presents a general overview of these basic categories.

Pedagogical Moves. Following the theoretical framework proposed by Wittgenstein (13), classroom discourse is viewed as a kind of "language game". The basic unit of discourse is defined as a pedagogical move.

In view of the complexity inherent both in the material and in the system of analysis, it seemed unreasonable to expect that any one person, no matter how well trained, would be able to code large sections of the data reliably without the checks offered by consultation with another coder. Therefore, the following procedure was used in all of the final coding of the data: (a) each protocol of a single class session was first coded by one member of the coding team; (b) this initial coding was then reviewed by a second person, who noted his disagreements with the original analysis; (c) finally, these disagreements were arbitrated by two coders, who, whenever possible, were not involved in the initial coding of the protocol. Despite the intrinsic difficulties involved in the analysis, this procedure resulted in a consistently high level of reliability in coding.

PROCESSING THE DATA

After the protocols had been coded, the data were transferred to data processing cards, and a program was prepared for the IBM 7090 computer. This program consisted essentially of a series of tabulations and cross-tabulations computed by number and percentage of lines of transcript in each category and moves in each category for each class session, for the total of four class sessions of each teacher, and for the sum of these results for all teachers.

The analysis of data in various categories was made on the basis of number of lines and number of moves, but because classes differed somewhat in total time devoted to the four experimental sessions, the final results were converted to percentage of total lines and moves in each category of the analysis.

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Part One: Basic Categories of Analysis

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Pedagogical Moves. Following the theoretical framework proposed by Wittgenstein (13), classroom discourse is viewed as a kind of "language game". The basic unit of discourse is defined as a pedagogical move.

These moves are classified in four major categories according to the pedagogical functions they serve in classroom discussion: structuring, soliciting, responding and reacting. These four types of moves describe the verbal maneuvers of both teachers and students in classroom discourse and set the framework for the analysis of meanings communicated in the classroom. (See Part Two below.)

Teaching Cycles. Pedagogical moves occur in classroom discourse in certain cyclical patterns and combinations that are designated teaching cycles. (See Part Two below.)

Categories of Meanings. Four functionally different types of meanings are communicated by teachers and pupils in the classroom: (1) substantive with associated (2) substantive-logical meanings; and (3) instructional with associated (4) instructional-logical meanings. Within each pedagogical move these four types of meanings are identified when they appear in the discourse and are coded according to the rules of analysis described in Appendix A.

Coding Format. The four types of pedagogical moves are the basic units for analyzing the discourse both of teachers and of pupils. One or more pedagogical moves may occur within an utterance, which is defined as a complete statement by a teacher or pupil at any one time in the discourse.

Within each pedagogical move, the four types of meanings (substantive with associated substantive-logical meanings; and instructional with associated instructional-logical meanings) are identified and coded when they occur in the discourse. Coding is from the viewpoint of the observer with pedagogical meaning inferred from the speaker's verbal behavior. Coders listen to tape recordings of class sessions as well as follow the transcribed protocols. Sample pages of coded protocols are given in Appendix B.

Each pedagogical move is coded as follows:

(1) / (2) / (3) / (4) / (5) / (6) / (7) / (8)

(1) Speaker (Teacher, Pupil, or Audio-Visual Device)
(2) Type of Pedagogical Move
(3) Substantive Meanings
(4) Substantive-Logical Meanings
(5) Number of Lines in (3) and (4)
(6) Instructional Meanings
(7) Instructional-Logical Meanings
(8) Number of lines in (6) and (7)

An example of a coded pedagogical move is:

T/ STR / IMX / XPL / 4 / PRC / FAC / 2

This is interpreted as follows: a teacher makes a structuring move in which something about imports and exports is explained for four lines of transcript and also states facts about class procedures for two lines of transcript.

Part Two: Pedagogical Moves and Teaching Cycles

1. Pedagogical Moves. Pedagogical moves, the basic units of classroom discourse, describe the verbal activities of teachers and pupils in the classroom. There are four basic types of moves which characterize the verbal interplay of teachers and pupils: structuring and soliciting, which are initiatory moves; and responding and reacting, which are reflexive moves.

1.1. Structuring (STR)

The primary pedagogical functions served by structuring moves are (a) focusing on areas of content (i.e. subjects, topics, issues, and problems) or classroom activities and procedures and (b) launching interaction between students and teachers. Structuring may focus on or launch the unit as a whole, a class session, or segment of a class session. Both subject matter (substantive content and related substantive-logical processes) and classroom procedures and activities (instructional content and associated instructional-logical processes) may be the objects of structuring.

Structuring moves set the context for subsequent behavior or performance and are therefore pivotal points in classroom discourse. They convey an implicit directive by launching classroom discussion in specified directions and by focusing on topics, subjects or problems to be discussed or procedures to be followed.

Structuring moves do not elicit a response, are not in themselves direct responses, and are not called out by anything in the immediate classroom situation except the speaker's concept of what should be said or taught.

Examples

T/STR: Last night I was sitting out on the porch trying to cool off and also trying to ask myself how to best begin this unit on international economics, international trade, world trade, or whatever else one wants to call it. And after thinking over a number of approaches, I wrote down on paper a number of items that are connected with our story. Some of them are within your experience. Some of them are found in your pamphlet.

T/STR: Well, tomorrow, we'll continue to talk about the problem of investments. I'd like to show you tomorrow another slide through the projector so that you can perhaps understand this more fully. Also tomorrow we'll move into the realm of some of the problems that people face when trying to engage in trade abroad.

T/STR: All right, getting down to it now, I think international trade, then, or international economic relations, whatever you want to call it, is a field of study within economics which in many cases has been unfortunately divorced from or too far divorced from domestic trade because there are great similarities, and also there are some rather distinct differences.

The postscript -A is added to STR (STR-A) when a structuring move occurs as a result of an earlier assignment as in student reports or debates. These activities are coded as structuring moves because they serve to focus on substantive areas and have no referent in the immediately preceding discussion. The postscript, however, serves to distinguish these moves from those structuring moves which have not been previously assigned.

Example

P/STR-A: Well, I was asking my father on, well, he imports watches -- that's his business. I wasn't able to interview him, but there was one thing I found out from - you know - when he just started importing. When you import watches from Switzerland, you have to have a code of letters you get from the Swiss government so that you can be shown that these watches aren't smuggled, and I thought this was a very interesting thing, and that way the American buyer can check also as they're brought over, these are not smuggled watches, or that, that they're not fake watches.

1.2. Soliciting (SOL)

Moves in this category are intended to elicit (a) an active verbal response on the part of the persons addressed; (b) a cognitive response, e.g., encouraging persons addressed to attend to something; or (c) a physical response.

Soliciting moves are clearly directive in intent and function and are crucial in any active classroom interchange between teachers and pupils. Although these moves may take all grammatical forms -- declarative, interrogative, and imperative -- the interrogative occurs most frequently. In coding soliciting moves, the various categories of analysis are coded in terms of the response expected rather than the solicitation itself.*

Examples

T/SOL: What are the factors of production?

P/SOL: May we keep our books open?

T/SOL: Turn the lights out, Bobby!

T/SOL: Pay attention to this!

1.3. Responding (RES)

Responding moves bear a reciprocal relationship to soliciting moves and occur only in relation to them. Their pedagogical function is to fulfill the expectation of soliciting moves and are, therefore, reflexive in nature. Since solicitations and responses are defined in terms of each other, there can be no solicitation that is not intended to elicit a response, and no response that has not been directly elicited by a solicitation.

Examples

T/SOL: What are the factors of production?
P/RES: Land, labor, and capital.

T/SOL: Why didn't you do the assignment?
P/RES: I was absent yesterday.

T/SOL: What is exchange control?
P/RES: I don't know.

---

* This procedure is adapted from Smith and Meux (9).

1.4. Reacting (REA)

These moves are occasioned by a structuring, soliciting, responding, or another reacting move, but are not directly elicited by them. Pedagogically, these moves serve to shape or mold classroom discussion by accepting, rejecting, modifying, or expanding what has been said previously. Reacting moves differ from responding moves, in that while a responding move is always directly elicited by a solicitation, preceding moves serve only as the occasion for reactions. For example, an evaluation by a teacher of a student's response is designated a reacting move; that is, the student's response is the occasion for the teacher's evaluative reaction, but it does not actively elicit it.

Examples

T/REA: All right.

T/REA: That's partly it.

P/REA: But he left out the most important part.

T/REA: Good. It limits specifically the number of items of one type or another which can come into this country. For example, we might decide that no more than one thousand of German automobiles will be imported in any one calendar year. This is a specific quota which the government checks.

When the coding symbol for a reacting move is underlined (REA), it indicates that the reaction is to more than a single move and/or is a summary of preceding discussion.

Examples

T/REA: Now Kathy has mentioned natural resources and you raise the problem of human skills. Both are factors of production.

T/REA: All of the instances of foreign investment that we have discussed here can be classified as either direct or portfolio types of investment.

2. Teaching Cycles. Pedagogical moves occur in classroom discourse in certain cyclical patterns and combinations, which are designated teaching cycles. A teaching cycle begins either with a structuring move or with a solicitation which is not preceded by a structuring move. A cycle ends with the move that precedes a new cycle. Teaching cycles are coded only after all pedagogical moves within a protocol have been coded individually. By defining structuring and soliciting moves as initiatory, and responding and reacting moves as reflexive moves, 21 types of teaching cycles are possible. The first 12 are structure-initiated; the next nine are initiated by soliciting moves.

1. STR
2. STR SOL
3. STR REA
4. STR REA REA...
5. STR SOL RES
6. STR SOL RES RES...
7. STR SOL REA
8. STR SOL REA REA...
9. STR SOL RES REA
10. STR SOL RES REA REA...
11. STR SOL RES REA RES...
12. STR SOL RES REA RES... REA...
13. SOL
14. SOL RES
15. SOL RES RES...
16. SOL REA
17. SOL REA REA...
18. SOL RES REA
19. SOL RES REA REA...
20. SOL RES REA RES...
21. SOL RES REA RES... REA...

Legend

STR - Structuring
SOL - Soliciting
RES - Responding
REA - Reacting
... - one or more additional moves of the kind designated. For example, RES... means one or more additional responses to the same solicitation.

Each of the 21 cycles represents a different pattern of pedagogical moves. Cycle 9, for example, represents a pattern of discourse which is initiated by a structuring move and is followed by a solicitation; this solicitation elicits a response which is the occasion for a reaction. Cycle 21 is initiated by a solicitation which elicits multiple responses which in turn are the occasion for multiple reactions.

Teaching cycles provide a way of describing pedagogical moves in relationship to each other. Using teaching cycles it is possible, for example, to determine the extent to which solicitations elicit single or multiple responses or the regularity with which reactions follow responses. If a single pedagogical move may be compared to a move in chess or a single play in football, then the teaching cycle may be seen as an interrelated series of moves or plays. The focus in teaching cycles is on combinations of pedagogical moves and sequences of linguistic events in the classroom.

Part Three: Categories of Meanings

Four functionally different types of meanings are communicated by teachers and students in the classroom: substantive with associated substantive-logical meanings; and instructional with associated instructional-logical meanings. Within each pedagogical move these four types of meaning are identified when they appear in the discourse and are coded according to the rules for analysis described in Appendix A.

1. Substantive Meanings. Substantive meanings refer to the subject matter under study by the class. In the present research, the categories of substantive meaning relate to the topic of "International Trade." The categories listed below were developed by means of a content

analysis of the pamphlet on which this teaching unit was based: International Economic Problems by James D. Calderwood (2).

1.1. Trade (TRA)

General discussion of trade; nature of trade in broad terms; definition of trade; why trade takes place.

1.11 Trade--Domestic and International (TDI)

Domestic trade compared and contrasted with international trade; discussion of consequences or differences between international and domestic trade when these differences are the focus of discussion.

1.12 Trade--Money and Banking (TMB)

Money and banking related to trade (not primarily aid); rate of exchange; balance of payments.

1.13 Trade--Who Trades With Whom (TWH)

Who (countries or individual corporations) trades with whom; discussion of multilateral trade.

1.2. Factors of Production and/or Specialization (FSP)

General discussion of factors of production; what the factors are; specialization; absolute and comparative advantage.

1.21 Factor of Production--Natural Resources (FNR)

Specific discussion of natural resources as a factor of production.

1.22 Factor of Production--Human Skills (FHS)

Specific discussion of labor as a factor of production.

1.23 Factor of Production--Capital Equipment (FCE)

Specific discussion of capital equipment as a factor of production.

1.24 Factors Other Than Natural Resources, Human Skills, and Capital Equipment Occurring in Discussion of Reasons for Trade (FRE)

Any discussion of reasons for trade or factors in addition to those specifically identified above (e.g., political reasons for trade).

1.3. Imports and/or Exports (IMX)

What is imported and/or exported from any country; dependence on imports and/or exports; effects of imports and/or exports on economy; balance of trade.

1.4. Foreign Investment--General (FOR)

General discussion of foreign investment.

1.41 Foreign Investment--Direct (FOD)

Specific discussion of direct foreign investment.

1.42 Foreign Investment--Portfolio (FOP)

Specific discussion of portfolio investment.

1.5. Barriers to Trade (BAR)

General discussion of barriers including policies directed toward maintaining or increasing barriers; how barriers work; effects of barriers.

1.51 Barrier--Tariffs (BAT)

Specific discussion of tariffs.

1.52 Barrier--Quotas (BAQ)

Specific discussion of quotas.

1.53 Barrier--Exchange Control (BAE)

Specific discussion of exchange control.

1.54 Barrier--Export Control (BAX)

Specific discussion of export control.

1.55 Barrier--Administrative Protectionism (BAA)

Specific discussion of administrative protectionism or red tape as a barrier to trade.

1.6. Promoting Free Trade (PFT)

Means of promoting free trade or reducing trade barriers; policies related to free trade; Common Market; Reciprocal Trade Agreements.

1.7. Relevant to Trade (REL)

Discussion relevant to trade or economics but not in the unit; (e.g., foreign aid.)

1.8. Not Trade (NTR)

Discussion not about trade or economics and not related to either.

2. Substantive-Logical Meanings. Substantive-logical meanings refer to the cognitive processes involved in dealing with the subject matter under study. Substantive-logical meanings are categorized under three general headings: (a) Analytic Process; (b) Empirical Process; and (c) Evaluative Process (11).

2.1. Analytic Process. Analytic statements are statements about the proposed use of language. Analytic statements are true by virtue of the meaning of the words of which they are composed. They depend for their truth on an agreed upon set of rules, and follow logically from accepted definitions. The statement "Mother is a female parent," for example, is necessarily true because "mother" means the same as "female parent." To define a term is to indicate what the term means, to state how it is used, or to give a verbal equivalent. A definition can be expressed in two ways: (1) by talking about the characteristics designated by a term; or (2) by talking about specific instances of the class designated by a term. Interpreting bears the same relationship to statements that defining does to terms.

2.11 Defining--General (DEF)

To define in a general manner is to give the defining characteristics of a class and to give a specific example of an item within the class. DEF is also coded when the type of definition asked for or given is not clear.

Example	Code*
T: What is a barrier?	T/SOL/BAR/DEF/1/-/-/-
P: It's something that hinders trade, like a tariff.	P/RES/BAR/DEF/2/-/-/-

2.111 Defining--Denotative (DED)

To define denotatively is to refer to the objects (abstract or concrete) to which the term is applicable. A denotative definition cites the objects to which the term may correctly be applied, and these objects constitute the denotation of the term. Thus, to give actual instances or examples of international trade (U.S. trading with Britain, Germany trading with France) is to give a denotative definition of the term "international trade."

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* Underlined symbols indicate specific part of code being illustrated. Line counts refer to lines of typescript in example, not to lines in actual protocols.

Examples	Code
T: What are public utilities?	T/SOL/NTR/DEF/1/-/-/-
P: Light, power, gas, water.	P/RES/NTR/DED/1/-/-/-
T: Can you give an example of a machine tool, Alex?	T/SOL/FSP/DED/2/-/-/-
P: A press.	P/RES/FSP/DED/1/-/-/-

2.112 Defining--Connotative (DEC)

To define connotatively is to give the set of properties or characteristics that an object (abstract or concrete) must have for the term to be applicable. **DEC** thus refers to the defining characteristics of a given term.

Examples	Code
T: Now what do we mean by quotas?	T/SOL/BAQ/DEF/1/-/-/-
P: The government sets a special amount of things that can come into the country in one year, and no more can come in.	P/RES/BAQ/DEC/4/-/-/-
T: What are machine tools?	T/SOL/FSP/DEF/1/-/-/-
P: Tools that make tools.	P/RES/FSP/DEC/1/-/-/-

2.12 Interpreting (INT)

To interpret a statement is to give its verbal equivalent, usually for the purpose of rendering its meaning clear.

Examples	Code
T: What does President Kennedy mean when he says, "We must trade or fade?"	T/SOL/TRA/INT/2/-/-/-
T: What does the slogan mean, "Buy American -- the job you save may be your own?"	T/SOL/BAR/INT/3/-/-/-

2.2. Empirical Process. Empirical statements give information about the world, based on one's experience of it. The distinguishing mark of empirical statements is that they are verified by tests conducted in terms of one's experience. In other words, one makes observations and decides whether the statement is true or false.

2.21 Fact Stating (FAC)

Fact stating is giving an account, description, or report of an event or state of affairs. To state a fact is to state what is, what was in the past, or what will be in the future. For example, a statement of a past event is, "Yesterday we reviewed some of the terms used by economists in talking about international trade." A statement of a present state of affairs is, "We are studying the problems relating to international trade." A statement referring to future events is, "We will discuss international monetary policies tomorrow."

The facts stated or reported need not be singular to be coded as FAC. Generalizations or universal statements are also coded FAC. For example, such general statements as, "No country is self supporting" or "All people need food" are coded FAC.

Examples	Code
T: Now in 1934... in 1934... who was President?	T/SOL/PFT/FAC/2/-/-/-
P: Roosevelt.	P/RES/PFT/FAC/1/-/-/-
T: The United States will say that the French franc is exchanged at how many per dollar?	T/SOL/TMB/FAC/3/-/-/-
P: Five.	P/RES/TMB/FAC/1/-/-/-

2.22 Explaining (XPL)

To explain is to relate an object, event, action or state of affairs to some other object, event, action or state of affairs; or to show the relation between an event or state of affairs and a principle or generalization; or to state the relationships between principles or generalizations.

Following Copi (3:420), explaining and inferring are regarded as the same process:

> An explanation is a group of statements or a story from which the thing to be explained can logically be inferred and whose assumption removes or diminishes its problematic or puzzling character.... It thus appears that explanation and inference are very closely related. They are, in fact, the same process regarded from opposite points of view. Given certain premises, any conclusion which can logically be inferred from them is regarded as being explained by them. And given a fact to be explained, we say that we have found an explanation for it when we have found a set of premises from which it can be logically inferred.

A statement is coded XPL when it concerns the effect of some event or state of affairs or some other event or state of affairs; or when the statement gives the reasons for an event or state of affairs (i.e., relates an event to some general principle). The relationship between two events, facts, or states of affairs is often expressed in terms of "If..., then...".

One way of showing relationships is by comparing and contrasting. Therefore, all explicit instances of comparing and contrasting are coded XPL.

Explanations frequently are given in response to questions asking why or how some events occur. The "why" or "how" may be explicit (i.e., in a preceding question) or implicit in the context of the statement. Also, the word "because" is frequently a verbal cue indicating the explanatory nature of the statement.

	Examples	Code
T:	Why do industrialized countries trade the most?	T/SOL/TWH/XPL/1/-/-/-
P:	Because they have more...more to offer each other.	P/RES/TWH/XPL/2/-/-/-
T:	What would happen if we raised the tariff on transistor radios?	T/SOL/BAT/XPL/2/-/-/-
P:	Prices would go up.	P/RES/BAT/XPL/1/-/-/-
P:	Japan would raise its tariffs on American stuff.	P/RES-M2/BAT/XPL/2/-/-/-

2.3. Evaluative Process. Evaluative statements are statements that grade, praise, blame, commend or criticize something. Evaluative statements are verified by reference to a set of criteria or principles of judgment. A common set of criteria is essential if individuals are to reach agreement regarding the value of a given act, object or state of affairs.

2.31 Opining (OPN)

To opine is to make statements in which the speaker gives his own valuation regarding (a) what should or ought to be done, or (b) fairness, worth, importance, quality of an action, event, person, idea, plan or policy.

	Examples	Code
P:	I think the farmer is being exploited.	P/REA/BAT/OPN/1/-/-/-
T:	Do you feel that a company who has gone into another country, has invested time, has invested money, has invested its knowledge, its skill and so on, has	

	a right to make a profit?	T/SOL/FOD/OPN/6/-/-/-
P:	Yes.	P/RES/FOD/OPN/1/-/-/-

2.32 Justifying (JUS)

To justify is to give reasons for holding an opinion regarding (a) what should or ought to be done, or (b) fairness, worth, importance, quality of an action, event, policy, idea, plan or thing.

Justifying statements are intended as support or criticism of opinions that have either been explicit in a previous statement or are implied within the context of the interaction. Justifying statements are frequently preceded by an opining statement, although this is not a necessary condition for coding JUS.

	Examples	Code
P:	I feel that the reason why the United States should not and probably will not in a number of years, join the Common Market, is that because the Latin countries with which we are associated would feel that we are no longer interested in their opinion.	P/STR-A/PFT/JUS/8/-/-/-
T:	Is it the government's responsibility then to train you for some other job, assuming that you couldn't get a job on your own?	T/SOL/PFT/OPN/4/-/-/-
P:	I believe that they should train them over again and give them government jobs or something because, I mean, after all if it weren't for the tariff and barriers, they'd still be in work.	P/RES/PFT/JUS/6/-/-/-

2.4. Not Clear (NCL)

NCL is coded when the wording or sense of a statement is ambiguous and the substantive-logical meaning cannot be determined.

3. Instructional Meanings. In addition to talking about a particular area of study, teachers and pupils also discuss matters pertaining to classroom management, assignments and procedures that are part of the instructional process. The items listed under instructional meanings categorize the content of this aspect of classroom discourse.

3.1. Assignment (ASG)

Discussion of reports, homework, debates, tests, readings, and the like.

Examples	Code
P: What should we do for tomorrow?	P/SOL/TRA/-/-/ASG/FAC/1
T: For tomorrow, I'd like you to read Chapters One and Two in this booklet.	T/RES/TRA/-/-/ASG/FAC/2

3.2. Material (MAT)

Discussion of textbooks, maps, chalkboard, teaching aids, films, newspapers, television programs, radio, and the like.

Examples	Code
T: Now, look at this graph.	T/SOL/IMX/-/-/MAT/PRF/1
P: I think this book is too easy.	P/REA/TRA/-/-/MAT/OPN/1

3.3. Person (PER)

Discussion of teacher's or pupil's person, physiognomy, dress, expression, or appearance. Used also when a personal experience is the topic under discussion.

Examples	Code
T: That's a pretty dress.	T/REA/-/-/-/PER/OPN/1
T: Have you ever been to Canada?	T/SOL/TMB/-/-/PER/FAC/1

3.4. Procedure (PRC)

Discussion of any course of action or set of activities, continuing activity, or future activity. Includes references to how class is to be conducted and what regulations are to be observed. Refers also to specific instances of class regulations or practice.

Examples	Code
T: Tomorrow we are going to discuss foreign investments.	T/STR/FOR/-/-/PRC/FAC/2
T: There will be no talking when I'm talking.	T/SOL/IMX/-/-/PRC/PRF/2
T: I think I've asked you to keep quiet.	T/SOL/TDI/-/-/PRC/PRF/1

3.5. Statement (STA)

Reference to any verbal utterance, particularly the meaning, validity, truth, or propriety of that utterance. May refer to a single word, sentence, paragraph or longer statement.

Examples	Code
T: That's correct.	T/REA/IMX/-/-/STA/POS/1
P: I think you're wrong.	P/REA/PFT/-/-/STA/NEG/1

3.6. Logical Process (LOG)

Discussion of the way language is used or of a logical process. Includes references to definitions, explanations, reasoning, arguments, and the like.

Examples	Code
T: What is a definition?	T/SOL/TRA/-/-/LOG/DEF/1
T: That's a negative argument.	T/REA/TRA/-/-/LOG/FAC/1

3.7. Action--General (ACT)

Reference to performance, action, or event where the nature of the performance (whether vocal, non-vocal, cognitive, or emotional) cannot be determined or when more than one of the subcategories listed below are involved.

Examples	Code
T: Stop that!	T/SOL/FOR/-/-/ACT/PRF/1
T: Think about that for a few minutes and then write your answers.	T/SOL/TRA/-/-/ACT/PRF/2

3.71 Action--Vocal (ACV)

Reference to action involving the emission of speech or sound. Used for the physical qualities of the action or the act of saying something. This includes references to reading aloud, pace, volume, pitch, and diction.

Examples	Code
T: Bobby, you said that before.	T/REA/TWH/-/-/ACV/FAC/1
T: Repeat that, please.	T/SOL/IMX/-/-/ACV/RPT/1

3.72 Action--Physical (ACP)

Reference to action where physical movements are primary. Includes writing, passing papers, walking, hearing and seeing.

Examples	Code
T: Turn out the lights, please.	T/SOL/PFT/-/-/ACP/PRF/1
P: May I leave the room?	P/SOL/BAT/-/-/ACP/AON/1

3.73 Action--Cognitive (ACC)

Reference to action where a cognitive process is principally involved. This includes thinking, imagining, knowing, supposing, understanding or not understanding, listening, believing, and reading (silent).

Examples	Code
P: I don't know.	P/RES/FCE/-/-/ACC/FAC/1
T: Now keep this in mind.	T/SOL/BAQ/-/-/ACC/PRF/1

3.74 Action--Emotional (ACE)

Reference to action where feelings or emotions are principally involved. Includes feeling bad, good, sorry, thankful, grateful, relieved, or upset.

Examples	Code
P: Thanks a lot.	P/REA/FHS/-/-/ACE/FAC/1
T: Keep your feelings out of this.	T/SOL/BAR/-/-/ACE/PRF/1

3.8. Language Mechanics (LAM)

Discussion of language usage or grammar.

Examples	Code
T: "I seen" or "I saw?"	T/SOL/TMB/-/-/LAM/FAC/1
P: How do you spell, "reciprocal?"	P/SOL/PFT/-/-/LAM/FAC/1
T: R-E-C-I-P-R-O-C-A-L.	T/RES/PFT/-/-/LAM/FAC/1

4. Instructional-Logical Meanings. While instructional-logical meanings include those processes listed under substantive-logical meanings, they also refer to distinctly didactic verbal moves such as those involved in positive and negative evaluating and giving instructions.

For this reason, additional subcategories under the logical processes are necessary.

4.1. *Analytic Process*. (same as in substantive-logical meanings)

4.11 *Defining General* (DEF)

4.111 *Defining Denotative* (DED)

4.112 *Defining Connotative* (DEC)

4.12 *Interpreting* (INT)

4.2. *Empirical Process*. (same as in substantive-logical meanings)

4.21 *Fact Stating* (FAC)

4.22 *Explaining* (XPL)

4.3. *Evaluative Process*.

4.31 *Opining* (OPN)--same as in substantive-logical meanings

4.32 *Justifying* (JUS)--same as in substantive-logical meanings

4.33 *Rating*

The categories under rating include judgments about the truth or falsity, or appropriateness or inappropriateness of preceding statements.

4.331 *Positive* (POS)

Distinctly affirmative evaluation usually in a reaction to a statement.

Examples	*Code*
T: Right.	T/REA/TDI/-/-/STA/*POS*/1
T: Yeah.	T/REA/FSP/-/-/STA/*POS*/1
T: Good.	T/REA/FOD/-/-/STA/*POS*/1

4.332 Admitting (ADM)

Mildly accepting or equivocally positive evaluation usually in a reaction to a statement.

Examples	Code
T: Mm-hmm	T/REA/PFT/-/-/STA/ADM/1
T: All right.	T/REA/FOR/-/-/STA/ADM/1
T: O.K.	T/REA/BAR/-/-/STA/ADM/1

4.333 Repeating (RPT)

Implicit evaluation in reaction in which there is only a repetition, rephrasing, or restatement of a preceding move with no explicit evaluative comment. Also coded for solicitations and responses which ask for or give a repetition of a previous statement.

Examples	Code
T: What countries belong to the Common Market?	T/SOL/PFT/FAC/2/-/-/-/
P: France.	P/RES/PFT/FAC/1/-/-/-/
T: France.	T/REA/PFT/FAC/-/-/STA/RPT/1
T: What?	T/SOL/IMX/-/-/ACV/RPT/1
P: Tin (a repetition).	P/RES/IMX/-/-/ACV/RPT/1

4.334 Qualifying (QAL)

Any indication of reservation, however mild or oblique, usually in reactions to statements.

Examples	Code
T: That's partly it.	T/REA/FSP/-/-/STA/QAL/1
T: That's one way of looking at it.	T/REA/BAR/-/-/STA/QAL/1
P: Yes, but ...	P/REA/PFT/-/-/STA/QAL/1

4.335 Not Admitting (NAD)

Evaluations which reject by stating the contrary rather than by making an explicitly negative comment.

Examples	Code
T: Imports and exports are not the factors of production.	T/REA/RSP/-/-/STA/NAD/2
T: We do trade with Yugoslavia.	T/REA/TWH/-/-/STA/NAD/1

4.336 Negative (NEG)

Distinctly negative evaluation usually in a reaction to a statement.

Examples	Code
T: No.	T/REA/FOP/-/-/STA/NEG/1
T: You're wrong.	T/REA/BAE/-/-/STA/NEG/1
T: Uh-uh.	T/REA/TWH/-/-/STA/NEG/1

4.337 Positive or Negative (PON)

Solicitations in which a request is made either for a positive or a negative evaluation.

Examples	Code
T: Right?	T/SOL/IMX/-/-/STA/PON/1
P: Am I wrong?	P/SOL/BAT/-/-/STA/PON/1

4.338 Admitting or Not Admitting (AON)

Solicitations in which a request is made to give an evaluation or to permit a given procedure or action.

Examples	Code
P: Is my homework O.K.?	P/SOL/TRA/-/-/ASG/AON/1
P: Is this all right?	P/SOL/PFT/-/-/PRC/AON/1

2

4.4. Extralogical Process. The two categories listed under extralogical process involve solicitations which call for the performance of a physical or cognitive act or solicitations which invite responses that are nonpropositional verbal utterances (e.g. commands, questions, or directives).

4.41 Performing (PRF)

Solicitations which ask or demand of someone to do something. These include directives and imperatives.

Examples	Code
T: Read chapters one and two.	T/SOL/TRA/-/-/ASG/PRF/1
T: John?	T/SOL/REL/-/-/ACV/PRF/1
T: Pay attention now!	T/SOL/TDI/-/-/ACC/PRF/1

4.42 Directing (DIR)

Solicitations which ask for a directive (a further solicitation). The solicitation must be general or involve more than one alternative rather than ask for approval or prohibition (AON) of a single, given procedure or action.

Examples	Code
T: How shall we handle this problem?	T/SOL/TRA/-/-/PRC/DIR/1
T: What ought we to do today?	T/SOL/TRA/-/-/PRC/DIR/1

SUMMARY OF CODING SYSTEM[*]

(1) SPEAKER: indicates source of utterance
Teacher (T); Pupil (P); Audio-Visual Device (A)

(2) TYPE OF PEDAGOGICAL MOVE: reference to function of move
Initiatory Moves
Structuring (STR): focuses, launches, sets context for subsequent behavior.
Soliciting (SOL): directly elicits verbal, physical, or mental response; coded in terms of response expected
Reflexive Moves
Responding (RES): fulfills expectation of solicitation; bears reciprocal relation only to solicitation
Reacting (REA): accepts, rejects, expands, modifies; occasioned by previous move but not directly elicited; summaries or reactions to more than one previous move coded REA
Not Codable (NOC): function uncertain because tape is inaudible

(3) SUBSTANTIVE MEANING: reference to subject matter topic (see pp. 34-37)

(4) SUBSTANTIVE-LOGICAL MEANING: reference to cognitive process involved in dealing with the subject matter under study
Analytic Process: proposed use of language or established rules of logic
Defining-General (DEF): defining characteristics of class or term with example of items within class explicitly given
Defining-Denotative (DED): object referent of term
Defining-Connotative (DEC): defining characteristics of class or term
Interpreting (INT): verbal equivalent of a statement, slogan, aphorism, or proverb
Empirical Process: sense experience as criterion of truth
Fact Stating (FAC): what is, was, or will be without explanation or evaluation; account, report, description, statement of event or state of affairs.
Explaining (XPL): relation between objects, events, principles; conditional inference; cause-effect; explicit comparison-contrast; statement of principles, theories or laws
Evaluative Process: set of criteria or value system as basis for verification
Opining (OPN): personal values for statement of policy, judgment or evaluation of event, idea, state of affairs; direct and indirect evaluation included
Justifying (JUS): reasons or argument for or against opinion or judgment
Logical Process Not Clear (NCL): cognitive process involved not clear

(5) NUMBER OF LINES IN 3 AND 4 ABOVE: see Appendix A for definition and procedures

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[*] Underlining indicates actual coding terminology.

(6) **INSTRUCTIONAL MEANINGS:** reference to factors related to classroom management

- Assignment (ASG): suggested or required student activity; reports, tests, readings, debates, homework, etc.
- Material (MAT): teaching aids and instructional devices
- Person (PER): person as physical object or personal experiences
- Procedure (PRC): a plan of activities or a course of action
- Statement (STA): verbal utterance, particularly the meaning, validity, truth or propriety of an utterance
- Logical Process (LOG): function of language or rule of logic; reference to definitions or arguments, but not presentation of such
- Action-General (ACT): performance (vocal, non-vocal, cognitive, or emotional) the specific nature of which is uncertain or complex
- Action-Vocal (ACV): physical qualities of vocal action
- Action-Physical (ACP): physical movement or process
- Action-Cognitive (ACC): cognitive process, but not the language or logic of a specific utterance; thinking, knowing, understanding, listening
- Action-Emotional (ACE): emotion or feeling, but not expression of attitude or value
- Language Mechanics (LAM): the rules of grammar and/or usage

(7) **INSTRUCTIONAL-LOGICAL MEANING:** reference to cognitive processes related to the distinctly didactic verbal moves in the instructional situation

- Analytic Process: see (4) above
  - Defining-General (DEF)
    - Defining-Denotative (DED)
    - Defining-Connotative (DEC)
  - Interpreting (INT)
- Empirical Process: see (4) above
  - Fact Stating (FAC)
  - Explaining (XPL)
- Evaluative Process
  - Opining (OPN): see (4) above
  - Justifying (JUS): see (4) above
  - Rating: reference to metacommunication; usually an evaluative reaction(REA)
    - Positive (POS): distinctly affirmative evaluation
    - Admitting (ADM): mild or equivocally positive evaluation
    - Repeating (RPT): implicit positive evaluation when statement (STA) is repeated by another speaker; also for SOL to repeat vocal action (ACV)
    - Qualifying (QAL): explicit reservation stated in evaluation; exception
    - Not Admitting (NAD): evaluation which rejects by stating the contrary; direct refutation or correction excluded
    - Negative (NEG): distinctly negative evaluation
    - Positive/Negative (PON): SOL requesting positive or negative evaluation
    - Admitting/Not Admitting (AON): SOL asking to permit or not permit procedure or action
- Extralogical Process: SOL expecting physical action or when logical nature of verbal response cannot be determined
  - Performing (PRF): asking, demanding; explicit directive or imperative
  - Directing (DIR): SOL with or without stated alternatives; asking for directive, not permission for specific action

(8) **NUMBER OF LINES IN 6 AND 7 ABOVE:** see Appendix A for definition and procedure

RATING SCALES FOR EVALUATIVE REACTIONS

POSITIVE	ADMITTING	REPEATING	QUALIFYING	NOT ADMITTING	NEGATIVE
POS	ADM	RPT	QAL	NAD	NEG
An explicitly positive statement.	A mild or equivocally positive statement.	An implicit admitting by a simple repetition, rephrasing, or restatement.	Any indication of reservation however mild or oblique.	Making no explicitly negative statement, but refusing to admit by stating the direct contrary. Indicated by restating a positive utterance in negative terms or a negative utterance in positive terms.	An explicitly negative statement.
Yes. Right. Correct. Yeah. A good answer. Exactly. Precisely	All right. O.K. Uh-huh.	Land, labor, and capital.	Yes, but... however... Nevertheless... That's one way of saying it.	England is not in the Common Market. We do have bauxite resources.	No. Wrong. That's a terrible answer. Nope. Uh-uh.

Example	Code
T: Give an example of a natural resource.	T/SOL/FNR/DED/1/-/-/-
P: Automobiles.	P/RES/FNR/DED/1/-/-/-

To this response, there may be the following kinds of evaluative reactions:

Basically Positive		Basically Negative	
STA/POS	T: Right.	STA/QAL	T: Well, that's one way of looking at it.
STA/ADM	T: All right.	STA/NAD	T: An automobile is not a natural resource.ee
STA/RPT	T: Automobiles.	STA/NEG	T: Wrong.

CODING THE PROTOCOLS

In this section several excerpts from the coded protocols are given to illustrate coding procedures and interpretations of the coded information.

EXAMPLE NO. 1

EXCERPT FROM PROTOCOL

Teacher (Move #1): Now, in order to pacify, or help satisfy, certain groups in American industry and American politics who want high protective tariffs, or who are clamoring for protection, we have inserted into our reciprocal agreements two -- what you might call -- safeguards which are coming up now as President Kennedy looks for greater authority in the tariff business. (Move #2) What have we inserted in here to give an element of protection or to stifle the outcries of American businessmen who want protection? Two clauses which we call ...? Yes?

Pupil (Move #3): The peril point and the escape clause.

Teacher (Move #4): Right. The peril point and the escape clause.

CODE

Move #1	T/STR/BAT/XPL/7/-/-/-
Move #2	T/SOL/BAT/FAC/3/-/-/-
Move #3	P/RES/BAT/FAC/1/-/-/-
Move #4	T/REA/BAT/-/-/STA/POS/1

INTERPRETATION

The teacher focuses on a substantive area by explaining something having to do with tariffs to the extent of seven lines (Move #1). He then solicits for three lines with the expectation that a factual response on tariffs will be given (Move #2). A pupil gives a one-line response by stating a fact about tariffs (Move #3). The teacher positively evaluates the statement by the pupil (Move #4).

The entire segment of discourse is an example of a teacher-initiated cycle 9 (STR SOL RES REA).

EXAMPLE NO. 2

EXCERPT FROM PROTOCOL

Teacher (Move #1): We specialize in what -- manufacturing or agriculture?

Pupil (Move #2): Manufacturing.

Teacher (Move #3): All right. We're able to support our people on a very small number of agricultural workers because we can specialize and make the trade with many places.

CODE

Move #1 T/SOL/FSP/FAC/1/-/-/-
Move #2 P/RES/FSP/FAC/1/-/-/-
Move #3 T/REA/FSP/XPL/2/STA/ADM/1

INTERPRETATION

The teacher asks for factual information relating to factors of production or specialization. (Move #1). A pupil gives a one-line factual response (Move #2). The teacher reacts by admitting the previous statement and adding two lines of explanation on the same subject (Move #3).

The entire segment of discourse is an example of a teacher-initiated cycle 18 (SOL RES REA).

EXAMPLE NO. 3

EXCERPT FROM PROTOCOL

Teacher (Move #1): For instance, what were your 1934 Reciprocal Trade Agreements? How did they work? What were they designed to do? Ellen?

Pupil (Move #2): I don't know.

Teacher (Move #3): We studied that just last week when we were studying the New Deal. (Move #4) All right, Ron?

Pupil (Move #5): Well, we agreed, I think we agreed to lower the tariffs for import duty in our country. Then the other country would reciprocate by agreeing to lower theirs.

Teacher (Move #6): Very good.

CODE

Move #1	T/SOL/PFT/XPL/3/-/-/-
Move #2	P/RES/PFT/-/-/ACC/FAC/1
Move #3	T/REA/PFT/-/-/PRC/FAC/1
Move #4	T/SOL/PFT/-/-/ACV/PRF/1
Move #5	P/RES-M4/PFT/XPL/3/-/-/-
Move #6	T/REA/PFT/-/-/STA/POS/1

INTERPRETATION

The teacher asks for an explanation concerning the promotion of free trade (Move #1). A pupil responds by making a one-line statement about her cognition (Move #2). The teacher reacts to the statement by stating factual information about a class procedure to the extent of one line (Move #3). He then calls upon a student to perform a vocal action (Move #4). A pupil responds to a solicitation that occurred four moves earlier by giving a three-line explanation relating to promoting free trade (Move #5). The teacher reacts by making a positive evaluation of the previous move (Move #6).

The entire segment of discourse is an example of a teacher-initiated cycle 21 (SOL RES REA RES... REA...).

RELIABILITY TEST

Although preliminary studies conducted during the course of developing the content analysis system had indicated high agreement between coders, it was necessary to test the reliability of the final system of analysis under rigorously controlled conditions and to obtain a quantitative estimate of the degree of reliability for each of the major kinds of meaning considered in the research.

Four members of the research staff participated in the reliability test. Twelve five-page samples were selected at random from protocols of six different teachers. The four coders were divided into two teams. Assignment of coders to the two coding teams was rotated so that all possible permutations of team membership were compared. Following our general procedures for analysis, one member of each team coded a given sample, the other member reviewed the coding, the both members of each team then arbitrated any disagreements between the initial coder and the reviewer.

After each of the 12 samples had been coded independently by the two teams, the codings of the teams were compared, and the percentage of agreement was computed in terms of both number of lines and number of moves. The results as presented in Table 2 indicate a consistently high degree of reliability for all major categories of analysis; agreement ranged from 84 to 96 per cent. Thus, the data strongly support the conclusion that the system devised in this research for a content analysis of classroom discourse is highly reliable.

TABLE 2

PERCENTAGE OF AGREEMENT AMONG CODING TEAMS FOR EACH MAJOR CATEGORY IN THE CONTENT ANALYSIS

Major Categories	Per Cent Agreement Moves	Per Cent Agreement Lines
Pedagogical Moves	94	93
Substantive Meanings	95	96
Substantive-Logical Meanings	88	91
Instructional Meanings	88	91
Instructional-Logical Meanings	87	84

PROBLEMS IN CODING

In the course of developing the content analysis system, numerous problems were encountered in defining categories and establishing rules of coding with sufficient rigor and clarity to insure reliable coding. As the results of the reliability test demonstrate, a majority of these problems were satisfactorily resolved. A brief description of some major issues faced during the development of the code may provide useful information for researchers who will either use this system in future work or devise similar techniques of analysis.

One of the earliest problems in coding involved the differentiation between the structuring and the reacting pedagogical moves. Solicitations and responses seemed to be distinctive enough to offer little difficulty, since they occur most frequently in conjunction with each other in the form of questions and answers. However, the unique characteristics of the pedagogical moves which framed the questions and answers in the sequence of discourse were less obvious. A structuring move, which launches and frames the subsequent discourse, might also contain a passing reference to preceding discussion; and a reacting move, whose primary focus is some aspect of the previous discussion might imply an introduction to a new topic of discourse. This problem was resolved by coding the material primarily on the basis of its manifest content, establishing comprehensive definitions of structuring and reacting, and providing numerous examples of each type of move. If doubt persisted in regard to differentiating structuring and reacting moves, the general rule was to code that pedagogical category which moved the discourse forward, thus coding structuring rather than reacting in the relatively few instances when definitions and rules specified in the code did not provide a clear-cut guide.

In the substantive-logical category, two frequent problems were encountered. The first involved discriminating between denotative defining and fact stating. This was resolved by coding defining when the referent of the statement was words *per se*, and coding fact stating when the referent was empirical. A second problem in the substantive-logical category concerned explaining and justifying. Both kinds of statements involved relationships of one sort or another, but explaining concerned facts which could conceivably be verified empirically, while justifying concerned personal opinions held by the speaker.

Perhaps the major difficulty in coding substantive meanings occurred when two or more of the major substantive topics, such as specialization and foreign investments, were contained in a single move. Because preliminary work in analyzing substantive meanings indicated that coding two or more substantive categories for one move would be likely to reduce, rather than raise, agreement between coders, double-coding was prohibited. The general policy followed in the analysis was to code each statement within the context of the ongoing discourse, unless there was a clear shift from one major topic to another. Thus, a single statement about imports within the context of an ongoing discussion of foreign investment was coded in the "foreign investment" category.

In a sense, this compromise represents a possible weakness in the coding system, for while it led to high reliability of coding, discussions which concerned the relationship between one major topic and another, such as trade barriers and foreign investment, was somewhat obscured by the coding procedures. For the purposes of the present research, this was not a crucial issue; but it does suggest a possible line of development for further modifications of the content analysis system.

Coding instructional meanings was aided by a specified order of precedence among the various subcategories which eliminated many of the difficult decisions in this area; for example, a teacher might direct the pupils to engage in some classroom procedure (PRC) which required the use of materials (MAT). By order of precedence, "materials" would be coded rather than "procedure." This solution was especially useful in coding instructional meanings, but it also suggests that the technique of setting a rationally based order of precedence in other categories of analysis might be a useful procedure to follow in future work.

At the outset of the content analysis, a major difficulty in the instructional-logical category was specifying the particular kind of evaluative reaction contained in a given move. This problem was largely resolved by establishing rating scales for the positively oriented evaluations and the negatively oriented evaluations.

These problems represent a sample of the issues dealt with in the development of the code. In many instances, solution of a problem depended upon a compromise between representing precisely the unique qualities of particular statements and establishing more abstract categories that lost some of the information conveyed by specific statements but also provided a reliable basis for classifying the meaning expressed. This is a problem encountered in almost all content analysis procedures, and these efforts represent a series of compromises which seemed best to capture the meanings expressed in classroom interactions. The relatively high degree of agreement obtained among coders lends credence to the final results obtained, but it should also be noted that the four coders who provided the data for the reliability test also participated in development of the code. Although the material used for estimating reliability was not used in developing the code, and thus represented an independent sample of discourse, the researchers who worked on various stages of the content analysis continuously interacted, discussed problems of coding, and probably developed, over time, a shared perspective which in part accounted for the high agreement in the final coding. A rigorous attempt has been made to make this perspective explicit in the definitions of categories and rules of coding, but it would be unreasonable to assume that the present system has completely objectified all aspects of the coding procedures. Nevertheless, it seems likely that researchers appropriately trained and thoroughly familiar with the code can use the present system of analysis reliably.

ANALYSIS OF EMOTIONAL MEANINGS

Preliminary Techniques

In the original research proposal, the analysis of emotional meanings was conceived as paralleling the analysis of logical and substantive meanings. Therefore, as the concept of the pedagogical move was developed, we planned to characterize each move in terms of two aspects of emotional meaning: valence and activity. The valence of emotional meaning is defined by a scale running from pleasant to unpleasant, and the activity dimension of meaning is defined by a scale running from active to passive. With the aim of devising a five-point scale for each dimension of emotional meaning, we first decided to select parts of the tape recordings which would illustrate each step on the scale of valence and each step on the scale of activity. Thus, from the pool of recorded items one could select excerpts which would illustrate the most positive emotional valence, the most negative valence, and each step in between. Similarly, with the activity dimension, the goal was to identify excerpts which represented the most active emotional meaning, the most passive, and each step in between.

After considerable work on the recordings, a large pool of excerpts was established and points on each scale defined by selected items. Several efforts to rate samples of the classroom discussion on the basis of these initial scales were unsuccessful. The most obvious problem was unreliability of ratings, that is, disagreement between raters. It became clear that the original plan calling for five-point rating scales was much too fine for reliable ratings. Therefore, the pool of items on the standardization scales was reshuffled, and somewhat grosser scales were developed. This process was continued until it seemed that adequate reliability could be obtained, and finally, a three-point scale for valence and a four-point scale for rating activity were devised.

Continued work with these revised scales did not prove satisfactory. In rating valence, there seemed to be subtle cues of approval or disapproval in much of what the teachers said, and apparently these were so subtle that consistent agreement between raters could not be achieved. We finally were forced to establish a rating scale which included a rather wide spectrum of emotional meanings in the neutral category, with only obvious and strong emotional expressions rated as either positive or negative. The same problem was encountered in developing the scale for rating activity. Thus, sensitivity or precision was sacrificed in order to obtain even minimally acceptable reliability.

As a result of this revision, most of the ratings were in the neutral category of both activity and valence; yet in listening to the recordings, it was obvious that the teachers were not neutral either in terms of valence or activity. Therefore, the scheme of rating had somehow failed to reflect accurately the emotional meanings being expressed.

The Unit of Analysis

In the light of this experience and out of conviction that the rating system previously devised was inadequate, the initial assumption that emotional meanings could be analyzed in a unit parallel to the units of logical and substantive analysis were re-examined. Repeated failure to develop an adequate scale for describing the emotional meaning of single pedagogical moves suggested increasing the unit of analysis for emotional meanings. When the analysis was based on the single pedagogical move, sometimes only a word, occasionally a short phrase, and often only a 10 or 15-second bit of speech, not enough information about emotional meanings was conveyed to permit reliable ratings. Therefore, judges were forced to rate almost all of the shorter units in the neutral category of both activity and valence. That is, while the teacher's overall emotional tone was clear when listening to the recordings, considering only the short phrase of a pedagogical unit did not provide enough information in itself to make a precise and still reliable rating of its emotional significance. Although emotional meaning conceptually parallels logical and substantive meanings, the pedagogical move, which served as an extremely useful basis for coding other kinds of units, could not be used profitably for describing emotional aspects of the discourse.

Nevertheless, it became apparent that each teacher did convey a more or less consistent emotional style. Although our original techniques had failed to capture these stylistic differences, listening to even a few minutes of each teacher seemed to provide enough information to characterize his emotional style. Ten and fifteen-second units were obviously too small; perhaps a few minutes might be more appropriate. It was decided to work with five-minute excerpts and to listen to a large number of such excerpts. Here, much greater consensus was found between raters, and there also appeared to be rather striking intrateacher consistency from excerpt to excerpt. That is, if a teacher was active in one excerpt, he also tended to be active in a second sample. Moreover, valence and activity were not the only dimensions along which the teachers seemed to vary. There also seemed to be clear-cut differences along a dimension which could be characterized as potency or strength of emotional expression. These observations led us to choose the semantic differential technique for describing a teacher's emotional style. In selecting scales for rating, scales for valence and activity were included, following the original research proposal, but also included were scales in two other dimensions, potency (or strength) and stability. The procedure was thus designed to describe each teacher's emotional style in terms of the meanings he conveyed along four dimensions: valence, activity, potency, and stability. These are four major dimensions of the semantic differential technique (8).

Revised Technique

Since it seemed reasonable to assume that our reactions to the emotional meanings expressed would be quite different from those of the typical high school student in the classes which participated in the research, it was decided that emotional meanings should be analyzed from the point of view of student observers. We could not return to the original classrooms of the teachers who participated in the research and ask their students to describe the emotional meanings conveyed by their teachers. Ratings, however, could be obtained from students similar in many respects to those students who actually participated in the first phase of the research. At least these students would provide a perspective from which to view emotional meanings more similar to the original sample of students than our own point of view could be.

Twelve seven-point differential scales were selected: three for each section. The semantic differential technique, developed by Osgood, Suci, and Tannenbaum (8), consists of a series of rating scales designed to measure several aspects of emotional meaning. On the basis of a series of factor analytic studies, several dimensions of meaning have been defined. The dimensions considered in this research are valence, potency, activity, and stability. Valence was described by the following scales: fair-unfair, positive-negative, and good-bad. Potency was described by hard-soft, heavy-light, and strong-weak. Activity was described by alive-dead, hot-cold, and fast-slow. Stability was described by sure-uncertain, stable-changeable and calm-wild.

Judges in this part of the study were 11th grade students in a communications class in a senior high school similar to those who participated in the experimental classes. Recordings of eight teachers were selected. These were the four teachers whose students had learned the most during the experimental period in terms of the test and the four teachers whose students had learned the least.

A five-minute section was randomly selected from each of the four class sessions of the eight teachers, making a total of 32 five-minute samples of teacher behavior to be rated. The judges were divided into groups of 12; a five-minute section of a recording was played, and then the judges made their ratings on the 12 scales of the semantic differential. These ratings, then, served as the basis of the analysis of emotional meanings communicated by each teacher.

The first question considered in the analysis of data was whether or not students could reliably rate each of the teacher selections along the several dimensions of emotional meaning. This problem concerns the interjudge agreement for each dimension, or, to put it another way, the internal consistency among the 12 judges of each five-minute sample. To evaluate this reliability, the 12 judges for each sample were divided randomly into two subgroups of six each. This provided two sets of ratings along each dimension for each recorded sample. Thus, the ratings of six judges were compared to the ratings of the other six judges in each group. In essence, this analysis parallels the usual analysis of a test for internal consistency, but in this case, the question under consideration was the internal consistency of judges. Following the usual procedure, the product-moment correlation between the two sets of rating was computed, and in order to obtain an estimate of the reliability of the ratings based on the total of 12 judges, the correlation was corrected by the Spearman-Brown prophecy formula. The correlations obtained are (1) valence, r .81; (2) activity, r .75; (3) potency, r .84; and (4) stability, r .66.

The results thus indicate adequate internal consistency of the rating for valence, activity, and potency, but relatively low and probably unacceptable reliability for the rating of stability. Therefore, ratings of valence, activity, and potency are adequate for further interpretation of the data; but any interpretation of the results in terms of the stability dimension is mitigated by a relatively low degree of internal consistency among the judges.

Students, therefore, tend to agree among themselves on at least three of the four aspects of emotional meaning considered in this research. Having determined the consistency among judges, we next considered the consistency of the teachers. In order to investigate the relationship between learning, for example, and what might be termed emotional style of the teachers, one must first know whether or not teachers are consistent over time in the emotional meanings they communicate. If teachers varied a great deal from day to day, it would be meaningless to speak of a teacher's particular style or the characteristic meanings he expressed. We therefore investigated the intrateacher consistency over the four class sessions.

Inspection of the data revealed that teachers did show some variation from session to session, perhaps as a function of sampling error as well as changes one would normally expect in interpersonal relations in the classroom. Thus, a teacher might have moderate ratings on the valence dimension for three sessions and either a relatively high or relatively low rating for the fourth session. These kinds of difference seem perfectly reasonable. The data also suggested, however, that differences among teachers was considerably larger than most of the difference within the four sessions for a single teacher. Thus, there appeared to be both a session-to-session difference as well as some degree of commonality over sessions for each teacher.

To investigate the question of consistency of teachers' emotional style somewhat more rigorously, a statistical procedure essentially the same as that followed in evaluating the reliability of judges was devised. In this case, however, the analysis dealt with the internal consistency (over sessions) of teachers, rather than judges. Following the typical "split-half" procedure, ratings for sessions two and four were compared to ratings obtained for sessions one and three. These ratings for the eight teachers were correlated and this correlation was corrected by the Spearman-Brown prophecy formula to take into account the reliability based on the total of four sessions. If the teachers were completely inconsistent, one would expect a correlation of zero; if the teachers were completely consistent from session to session, one would expect a reliability of +1.0. The correlations obtained for each dimension were as follows: valence, r .70; activity, r .81; potency, r .95; stability, r .62.

This analysis suggests rather high internal consistency among the teachers for both potency and activity; somewhat lower consistency for valence; and considerably lower consistency for the stability dimension. Thus, if a teacher is described as strong and active in one session, there is a substantial probability that he will be described as strong and active in subsequent sessions. If a teacher is described as relatively good or bad in one session there is at least a moderate degree of probability that he will be similarly described in other sessions. The stability dimension also shows some degree of commonality across sessions for each teacher, but there also appear to be considerable session-to-session differences in this dimension.

These results indicate that one can meaningfully talk about a teacher's emotional style as something which is relatively consistent over time, at least insofar as the dimensions of potency and activity are concerned, and to a lesser degree, in terms of valence. Teachers thus tend to be consistent over time in the kinds of emotional meanings they convey to students.

CHAPTER FOUR

RESULTS

The major aim of this chapter is to provide a description of the discourse in the classrooms studied. This description is framed in terms of various meanings considered in the content analysis. The purpose is to present the general trends and similarities that are apparent in the sample of classrooms and to provide a picture of the distribution and range of individual differences found for each dimension of meaning. For the most part, the data for each teacher are summarized over the four sessions for comparisons among the 15 classes. In some instances, such as in considering teacher-pupil activity, the four sessions will be considered separately.

Reviewing the data in terms of percentage of total lines of transcript for each class and percentage of various types of pedagogical moves for each class provides a reasonble basis for comparing and contrasting the discourse in the various classes, despite the small differences in total time among the 15 classes. In most parts of the analysis, the results obtained in terms of percentage of lines are essentially the same as those obtained for percentage of moves. For economy of presentation, therefore, the results will be discussed in terms of percentage of lines, unless the patterns of discourse are different in terms of percentage of moves, in which case both lines and moves will be discussed.

Beginning with an analysis of teacher-pupil activity, this chapter considers the results for each of the major categories of meaning and some of the more important relations among categories. Next, a summary description of the classroom discourse is presented, with some indication of the apparently significant deviations from this typical pattern. Finally, various investigations of possible correlates of learning as measured by the pre-post test differences are reported.

TEACHER-PUPIL ACTIVITY

Activity in this context is defined as the percentage of total number of lines of transcript and moves spoken either by a teacher or by the pupils in a particular class.

Total Activity Over All Sessions

Data relating to total activity over all sessions for teachers and pupils are summarized in Table 3. Inspection of these data reveals that teachers in all of the classes did most of the talking, although there are indeed individual differences in the degree to which teachers monopolized the classroom discourse.

Percentage of Lines. In terms of lines spoken, the median percentage of lines for the 15 teachers is 72.6. The distribution is fairly peaked in that seven of the 15 teachers spoke between 70 and 75 per cent of the total lines of discourse for all sessions. In this sample of classes, therefore, the teacher-pupil ratio of amount spoken was approximately the same for all classes. There was a range of teacher activity, however, from 60.3 per cent to 92.8 per cent. In fact, there was a cluster of four teachers at the 60 per cent range; this cluster included Teachers 2, 4, 5, and 15. Only three of the 15 teachers spoke more than 80 per cent of the lines; these included Teacher 6, (82.2), Teacher 10

TABLE 3

PERCENTAGE OF LINES AND MOVES FOR TEACHERS, PUPILS, AND AUDIO-VISUAL DEVICES IN EACH OF THE FIFTEEN CLASSES

Class		Teacher	Pupil	Audio-Visual Device
1	Moves	60.6	39.3	0
	Lines	76.3	23.7	0
2	Moves	59.0	41.0	0
	Lines	61.5	38.5	0
3	Moves	65.8	34.2	0
	Lines	70.2	29.8	0
4	Moves	61.4	38.6	0
	Lines	60.3	39.7	0
5	Moves	58.3	41.7	0
	Lines	61.3	38.7	0
6	Moves	64.5	35.5	0
	Lines	82.2	17.8	0
7	Moves	63.7	36.3	0
	Lines	72.0	28.0	0
8	Moves	61.7	38.4	0
	Lines	73.5	26.5	0
9	Moves	72.0	27.9	0
	Lines	92.8	7.2	0
10	Moves	62.3	37.6	0
	Lines	81.2	18.8	0
11	Moves	66.9	33.0	0
	Lines	73.7	26.3	0
12	Moves	58.3	41.7	0
	Lines	73.4	26.6	0
13	Moves	60.1	39.9	0
	Lines	70.9	29.1	0
14	Moves	66.4	33.5	0.1
	Lines	72.6	20.3	7.1
15	Moves	57.8	41.3	0.9
	Lines	60.8	36.3	3.0
$\bar{X}$	Moves	61.7	38.2	0.1
	Lines	72.1	27.2	0.7

(81.2), and Teacher 9 (92.8). Notwithstanding the clusters at the extremes of the distribution, the most remarkable characteristic of these data is the number of teachers clustering at the center of the distribution between 70 and 75 per cent. This indicates that the teacher-pupil ratio of speech was about 3 to 1 in most classrooms sampled.

Percentage of Moves. The analysis in terms of percentage of moves presents approximately the same picture, for the teachers not only speak the majority of lines, but also make the majority of pedagogical moves. The teacher-pupil ratio in terms of percentage of moves, however, is somewhat lower than that for percentage of lines. The median percentage of moves for all teachers is 61.7, with a range from 57.8 to 72 per cent. As in the analysis of percentage of lines, the distribution of moves is fairly peaked in that the data for 10 of the 15 classrooms show that teachers made between 57.8 and 64.5 per cent of the total moves. For these classrooms, therefore, the teacher-pupil ratio of moves was approximately 3 to 2. In only three classes was the ratio 2 to 1: Teacher 11 made 66.9 per cent of the moves; Teacher 14 made 66.4 per cent of the moves; and Teacher 3 made 65.8 per cent of the moves. One class was distinctly different from all other classes in that the teacher made the great majority of pedagogical moves. This was Teacher 9 who made 72 per cent of the total moves, with a teacher-pupil ratio of 2.6 to 1.

The data summarized in Table 3 reveal a marked similarity in total number of lines and moves spoken by the various teachers. This is particularly noteworthy in view of the fact that the teachers were told they could conduct their classes in any way they wished. Undoubtedly, they did not feel completely free, in part as a consequence of being recorded while teaching. It is nevertheless remarkable that so many of the teachers in different schools, given the freedom to conduct their classes as they chose, all spoke about the same proportion of the total number of lines and moves.

Activity in Each Session

Table 4 summarizes teacher and pupil activity for each of the four sessions for each of the 15 teachers. These data demonstrate a degree of consistency over sessions for each teacher. This is particularly true if one considers the first three class sessions. In terms of percentage of lines, for example, Teacher 1 in the first session spoke 78 per cent of the lines, in the second session 72.6 per cent, and in the third session 73.7 per cent. Teacher 9, on the other hand, spoke 92.2 per cent in session 1, 92.3 per cent in session 2, and 94.8 per cent in session 3. For some of the classes, the amount of teacher activity in the fourth session was somewhat different from the amount displayed in the first three sessions, probably reflecting the fact that some of the teachers assigned debates or student reports for the fourth class session. Thus, Teacher 5 in the fourth session spoke only 28.2 per cent of the lines, while in the first three sessions he had spoken approximately 70 per cent of the lines. Similarly, Teacher 11 spoke only 37.9 per cent of the lines in the fourth session, while in the other three sessions he had spoken between 75 and 90 per cent of the total lines.

Despite these differences for the fourth session, however, the amount of teacher activity seems to be fairly stable over time. In all classrooms, the teachers spoke a majority of the lines. The teacher who

TABLE 4

TEACHER-PUPIL ACTIVITY IN TERMS OF PERCENTAGE OF LINES AND MOVES BY SESSION FOR EACH OF THE FIFTEEN CLASSES AND FOR ALL CLASSES COMBINED

Class		Teacher Session I	Teacher Session II	Teacher Session III	Teacher Session IV	Teacher Unit of Four Sessions	Pupil Session I	Pupil Session II	Pupil Session III	Pupil Session IV	Pupil Unit of Four Sessions
1	Moves	61.1	58.6	60.6	64.8	60.6	38.9	41.4	39.4	35.2	39.3
	Lines	78.0	72.6	73.7	82.6	76.3	22.0	27.4	26.3	17.4	23.7
2	Moves	52.9	58.0	63.2	62.5	59.0	47.1	42.0	36.8	37.5	41.0
	Lines	45.1	53.2	67.8	76.6	61.5	54.9	46.8	32.2	23.4	38.5
3	Moves	69.1	66.9	62.4	63.5	65.8	30.9	33.1	37.6	36.6	34.2
	Lines	80.7	74.4	71.7	50.9	70.2	19.3	25.6	28.3	49.1	29.8
4	Moves	63.5	57.6	63.6	60.9	61.4	36.5	42.4	36.5	39.1	38.6
	Lines	58.0	55.4	58.4	70.3	60.3	42.0	44.6	41.6	29.7	39.7
5	Moves	64.6	60.3	62.8	43.7	58.3	35.4	39.7	37.3	56.3	41.7
	Lines	76.1	72.6	66.9	28.2	61.3	23.9	27.4	33.1	71.8	38.7
6	Moves	63.9	66.5	63.4	64.1	64.5	36.2	33.5	36.7	35.9	35.5
	Lines	87.4	82.9	76.3	82.1	82.2	12.6	17.1	23.7	17.9	17.8
7	Moves	63.6	62.5	63.7	65.8	63.7	36.4	37.5	36.3	34.3	36.3
	Lines	68.2	76.6	75.7	67.4	72.0	31.8	23.4	24.3	32.6	28.0
8	Moves	61.2	61.9	61.9	62.0	61.7	38.8	38.2	38.1	38.0	38.4
	Lines	67.8	74.1	78.7	77.3	73.5	32.2	25.9	21.3	22.8	26.5
9	Moves	71.3	68.8	76.9	72.9	72.1	28.7	31.2	23.1	27.1	27.9
	Lines	92.2	92.3	94.8	92.3	92.8	7.8	7.7	5.2	7.8	7.2
10	Moves	59.9	63.8	61.7	64.3	62.3	40.1	36.2	38.3	35.7	37.7
	Lines	68.1	84.2	85.1	87.3	81.2	31.9	15.8	14.9	12.7	18.8
11	Moves	71.1	72.7	63.7	55.5	66.9	28.9	27.3	36.3	44.6	33.1
	Lines	88.2	88.6	74.6	37.9	73.7	11.8	11.4	25.5	62.2	26.3
12	Moves	62.6	58.9	53.8	59.8	58.3	37.4	41.1	46.2	40.2	41.7
	Lines	78.1	72.9	64.6	80.7	73.4	21.9	27.1	35.5	19.3	26.6
13	Moves	61.0	60.9	58.5	59.6	60.1	39.0	39.1	41.5	40.4	39.9
	Lines	72.7	68.8	72.7	69.0	70.9	27.3	31.2	27.3	31.0	29.1
14	Moves	66.2	68.7	64.9	65.9	66.4	33.8	31.3	35.1	33.3	33.5
	Lines	80.5	80.6	76.5	54.4	72.6	19.5	19.4	23.5	18.9	20.3
15	Moves	56.4	60.4	60.7	48.6	57.8	43.7	39.6	39.4	44.5	41.3
	Lines	69.5	70.2	68.3	30.3	60.8	30.5	29.8	31.7	56.1	36.3
$\bar{X}$	Moves	62.4	62.2	61.7	60.5	61.7	37.6	37.8	38.3	39.5	38.2
	Lines	73.6	74.6	73.5	68.3	72.1	26.4	25.4	26.5	31.7	27.2

spoke approximately 80 to 90 per cent of the lines in one session also tended to be in that range of activity for other sessions, unless some special classroom exercise such as a student debate was scheduled. Similarly, a teacher who was at the lower end of the distribution of activity for the first sessions, such as one who spoke only 60 per cent of the lines, tended to remain at that level of verbal activity over class sessions. This means that there are some teachers who are more active than others, and this degree of teacher activity is a stable characteristic of the discourse in a given classroom.

PEDAGOGICAL MOVES

The data summarized in Table 5 clearly demonstrate that the roles of teacher and pupil in the classroom are distinctively defined by the frequency of behavior in each category of pedagogical moves. The teacher structures, solicits, and reacts; the pupil responds, occasionally reacts, and from time to time structures when giving assigned reports or participating in assigned debates. There is relatively little deviation from these role patterns.

Teacher's Role

Among the three pedagogical categories which account for almost all teacher activity -- structuring, soliciting, and reacting -- the smallest proportion of lines is devoted to structuring, the next largest to soliciting, and the largest proportion to reacting. In comparison with other moves, responding accounts for a very small proportion of the teacher's discourse.

TABLE 5

PERCENTAGE OF LINES AND MOVES IN EACH PEDAGOGICAL CATEGORY FOR TEACHERS AND PUPILS IN EACH OF THE FIFTEEN CLASSES AND FOR ALL CLASSES COMBINED

Class		TEACHER					REA	PUPIL						REA
		SOL	RES	STR	REA	REA	Total	SOL	RES	STR	STR-A	REA	REA	Total
1	Moves	29.9	1.4	2.5	25.3	0.9	26.2	1.7	30.0	0.4	0	3.4	0	3.4
	Lines	27.5	1.4	7.2	36.9	3.1	40.0	1.2	18.0	0.4	0	2.3	0	2.3
2	Moves	29.9	1.2	4.8	20.8	1.6	22.4	2.6	26.6	0.7	0	7.5	0.2	7.7
	Lines	20.1	1.0	11.2	25.5	3.4	28.9	1.6	23.9	0.8	0	10.2	0.4	10.6
3	Moves	36.6	2.1	7.0	18.8	1.2	20.0	3.1	24.4	0.03	1.2	3.7	0	3.0
	Lines	30.1	3.7	10.1	22.9	3.3	26.2	2.1	18.2	0.02	6.3	2.5	0	2.5
4	Moves	29.6	2.8	4.1	23.5	1.3	24.8	3.1	24.6	0.04	0.1	8.6	0	8.6
	Lines	20.7	3.7	5.9	26.7	3.3	30.0	1.8	24.8	0.6	4.8	7.0	0	7.0
5	Moves	24.5	5.8	5.2	20.4	1.6	22.0	9.4	17.9	0.4	1.2	9.0	0.1	9.1
	Lines	15.5	9.4	15.5	17.3	3.4	20.7	5.4	14.4	0.5	6.1	10.7	0.2	10.9
6	Moves	33.7	3.3	3.7	20.7	2.8	23.5	2.7	27.5	0.2	0	2.5	0	2.5
	Lines	20.2	5.9	16.2	25.5	14.4	39.9	1.1	14.3	0.04	0	1.6	0	1.6
7	Moves	25.7	5.8	7.8	22.5	1.1	23.6	6.6	21.4	1.7	0.2	4.9	0	4.9
	Lines	15.5	7.5	24.0	22.2	2.4	24.6	4.2	13.5	2.4	3.3	4.1	0	4.1
8	Moves	27.6	4.4	3.7	23.5	1.7	25.2	4.7	22.9	0.4	0	8.0	0	8.0
	Lines	20.4	8.8	8.8	30.5	4.5	35.	2.9	15.0	0.3	0	7.3	0	7.3
9	Moves	29.0	1.7	13.2	25.8	2.2	28.0	1.5	22.5	0	0	2.8	0	2.8
	Lines	12.8	0.9	46.6	29.5	2.8	32.3	0.3	5.8	0	0	0.9	0	0.9
10	Moves	28.3	2.4	5.5	23.4	2.1	25.5	3.1	25.3	0.1	0	5.5	0	5.5
	Lines	12.0	5.3	19.7	34.7	9.4	44.1	1.2	10.6	0.03	0	5.9	0	5.9
11	Moves	32.9	2.1	8.6	20.7	2.2	22.9	2.6	26.7	0.4	0.7	1.3	0	1.3
	Lines	23.2	2.8	22.4	18.2	6.8	25.0	0.9	13.4	0.5	9.8	1.2	0	1.2
12	Moves	21.5	5.8	7.3	21.3	1.1	22.4	8.0	18.6	0.1	0.1	11.2	0	11.2
	Lines	16.0	6.2	22.0	25.3	3.3	28.6	4.1	10.0	0.1	3.1	7.9	0	7.9
13	Moves	30.1	3.7	1.2	22.0	2.3	24.2	4.2	30.1	0.4	0	3.9	0	3.9
	Lines	28.9	6.1	1.7	27.5	6.6	34.	3.0	21.4	0.7	0	3.3	0	3.3
14	Moves	29.8	2.7	4.5	25.9	2.5	28.4	2.7	25.2	0	0.6	1.5	0	1.5
	Lines	23.8	3.5	8.0	28.3	8.5	36.8	1.3	13.0	0	4.3	0.6	0	0.6
15	Moves	24.6	5.3	3.6	23.0	1.2	24.2	7.3	22.9	0.4	0.2	9.2	0	9.2
	Lines	14.7	9.1	8.7	24.2	4.0	28.2	5.5	15.6	0.2	3.6	10.8	0	10.8
$\overline{X}$	Moves	28.8	3.5	4.8	22.6	1.7	24.2	4.4	25.0	0.4	0.3	5.7	0.02	2.5
	Lines	20.3	5.0	14.5	26.7	5.3	32.0	2.5	15.6	0.4	2.6	5.1	0.03	1.0

Structuring. The median amount of structuring (STR) for teachers is 11.2 per cent, with a low of 1.7 and a high of 46.6. The high of 46.6, which means nearly half of the classroom discourse was devoted to teacher structuring, is represented by Teacher 9. He is clearly different from the majority of other teachers, for the next highest percentage of structuring is 24. The effective range for structuring, other than Teacher 9, is thus between 1.7 per cent for Teacher 13 and 24 per cent for Teacher 7. Seven of the teachers range between six and 11 per cent, so that nearly half of the teachers are clustered in this relatively small range. For most teachers, structuring accounts for approximately one-tenth of the classroom discourse.

Soliciting. The median percentage of soliciting (SOL) is 20.2, represented by Teacher 6. The range is from 12 per cent for Teacher 10, to 30.1 per cent for Teacher 3. Eight of the 15 teachers are clustered between 15 and 20 per cent. Thus, for most teachers there is roughly five to ten per cent more soliciting than structuring.

Reacting. For most teachers the largest proportion of lines is devoted to reacting (REA). The median percentage of lines involving reacting is 25.5, with a range from 17.3 to 36.9 per cent. The high of 36.9 per cent is represented by Teacher 1, whose pattern of teaching was consistently a question by the teacher followed by a student response which in turn was almost always followed by a teacher reaction. The effective range for reacting is even more restricted than that for either structuring or soliciting. Eleven of the 15 teachers are clustered between 22 and 30 per cent of the lines devoted to reacting. Outside of this range are only four teachers: two are at the lower end of the distribution, with 17 and 18 per cent respectively; and two teachers are at the upper end of the distribution, with 35 and 37 per cent.

If these data are considered in terms of percentage of moves, rather than lines, the results for soliciting and reacting are slightly changed. While the analysis based on percentage of lines shows that teachers reacted more than they solicited, there was in fact a larger proportion of discrete moves devoted to soliciting. The median percentage of moves concerned with soliciting was 29.6, while the median percentage of reacting moves was 22.5. This suggests that although a larger number of moves was devoted to soliciting, the length of the reacting moves as measured by number of lines was generally greater. These small differences, however, do not change the general picture of the teaching pattern, for regardless of whether one considers either percentage of lines or moves, the teacher's role is characterized by a relatively high proportion of soliciting and reacting.

In contrast to the usual reacting statements, coded REA, the reactive statements that summarize, coded REA, represent much less of the teachers' activity. In this category, the range of percentage of lines is from 2.4 to 14.4, with a median of 3.4 per cent. The high of 14.4 per cent for Teacher 6, who is also a high structuring teacher, is clearly different from most of the other teachers. The next highest percentage of REA is 9.4 for Teacher 10. Of the total sample of 15 teachers, ten cluster within a range from two to four per cent of lines devoted to REA; in other words, nearly 80 per cent of the entire sample falls within a range of two percentage points. This underscores the fact that in certain respects the 15 teachers were remarkably similar to each other in their classroom behavior.

Responding. In comparison with other types of moves, teachers respond (RES) very infrequently. The median percentage of responding for teachers is 5.3. The range is from 0.9 per cent for Teacher 9 to 9.4 per cent for Teacher 5. This low proportion of teacher responding is obviously related to a comparably low incidence of pupil soliciting.

Summary of Teacher's Role. The data, in terms of percentage of lines and moves, reveal that the role of the teacher in classroom discourse is characterized by a relatively high proportion of soliciting and reacting, with relatively less activity devoted to structuring, and even less concerned with responding.

Pupil's Role

The pupil's role is distinguished from the teacher's role by significantly different proportions of pedagogical moves.

Responding. The pupil's primary job is to respond, as illustrated by the fact that for pupils the largest proportion of lines is devoted to responding (RES), with a range from 5.8 to 24.8 per cent and a median of 14.4 per cent. The majority of classes fall within a range of a few percentage points. Nine of the classes cluster between 13 and 18 per cent, so that a range of only five percentage points accounts for 60 per cent of the sample in terms of the amount of discourse concerned with pupil responding.

As one might have inferred from the data on teacher-pupil activity, the low of 5.8 per cent for pupil responding is represented by the classroom in which the teacher showed the highest amount of activity. This was Class 9, in which pupils were principally responsible for listening rather than responding. In contrast, the high of 24.8 per cent is represented by the pupils in Class 4 whose main job was responding to the teacher's repeated questions. In this class, the teacher asked many relatively brief questions, requiring the pupils to respond with relatively long answers. Despite these differences among the classrooms, however, the data incontrovertibly demonstrate that in all classrooms sampled the pupil's task was to respond to the teacher's solicitations.

Soliciting. In marked contrast to the percentage of lines devoted to pupil responding is the amount of pupil soliciting (SOL). Pupils infrequently ask questions. The range for pupil soliciting in terms of percentage of lines is from 0.3 to 5.5 with a median of 2.1. In terms of median percentage of lines, pupils thus respond approximately seven times more frequently than they solicit. The lowest soliciting rate is in Teacher 9's class, where pupils solicit only 0.3 per cent of the time. The similarity of the classrooms is emphasized by the fact that all of the classrooms are accounted for by a range of only five percentage points in terms of the amount of pupil soliciting. It is clear that the teacher's job is to solicit, and the pupils rarely assume this aspect of the teacher's role.

Reacting. Although responding comprises by far the largest proportion of pupil activity, reacting (REA) accounts for a small, but appreciable, amount of activity. The range of pupil reactions is from 0.6 to 10.8 per cent with a median of 4.1. However, eight of the classrooms studied are included within a range of only three percentage points, from 0.6 to four per cent. While the pupil's main job is to respond, in some classrooms they do react and solicit to some extent.

Pupils almost never give summary reactions (REA). This pedagogical move for pupils occurred in only two classes and in both instances represented less than half of one per cent of total discourse.

Structuring. Pupils rarely structure. In only one class is pupil structuring greater than one per cent of the lines; in this class, Class 7, pupil structuring accounted for only 2.4 per cent of the discourse. Assigned structuring (STR-A), which included activities such as debates and reports, occurred in eight of the 15 classes; the range for the entire sample in this category was from zero to 9.8 per cent, with a median of 3.1. In only three classes was assigned structuring responsible for more than five per cent of the discourse. Therefore, while not an uncommon aspect of classroom discourse, STR-A does not represent a major aspect of pupil behavior in most of the classes studied.

Summary of Pupil's Role. The results demonstrate that the pedagogical role of pupils is even more restricted than it is for teachers. Pupils speak almost always in response to teachers' solicitations; occasionally they react; and in some classes they give reports or participate in debates. On the other hand, pupils infrequently ask questions, rarely structure the classroom discourse, and almost never summarize the preceding discussion. From a pedagogical point of view, the role of the pupil is indeed a limited one.

A Common Pattern of Discourse

The data presented in Table 6 show that for each class three of the pedagogical categories account for similar proportions of moves.

TABLE 6

PERCENTAGE OF MOVES CODED AS TEACHERS' SOLICITATIONS, PUPILS' RESPONSES, AND TEACHERS' REACTIONS

Class	Teacher SOL	Pupil RES	Teacher REA & REA
1	29.9	30.1	26.2
2	29.9	26.6	22.4
3	36.6	24.4	20.0
4	29.6	24.6	24.8
5	24.5	17.9	22.0
6	33.7	27.5	23.5
7	25.7	21.4	23.6
8	27.6	22.9	25.2
9	29.0	22.5	27.9
10	28.3	25.3	25.5
11	32.9	26.7	22.9
12	21.5	18.6	22.4
13	30.8	30.1	24.3
14	29.8	25.2	26.4
15	24.8	22.9	24.2
$\bar{X}$	28.8	25.0	24.3

These categories are (1) teacher solicitation, (2) pupil response, and (3) teacher reaction, both REA and REA.

Although the percentages of moves in the three categories for a given class are not identical, the differences among classes are relatively small in comparison with the difference between one of these categories and any other pedagogical category of analysis. Teacher solicitations, pupil responses, and teacher reactions each account for approximately a fourth of the total moves in the discourse of any class, while other categories such as teacher responses and pupil reactions account for only five or six per cent of the moves in a given class. Thus the order of magnitude for frequencies in each of the three most common categories clearly differs from the frequency for any other type of pedagogical move made either by teachers or by pupils.

These findings suggest that in the present sample of classes the fundamental pedagogical pattern of discourse consisted of a teacher's solicitation followed by a pupil's response; this sequence was frequently followed by a teacher's reaction. In other words, a typical pattern started with the teacher asking a question (T/SOL), which a pupil answered (P/RES), followed by the teacher's reaction to or evaluation of the pupil's response (T/REA).

Other kinds of moves occurred in the classrooms and served pedagogical functions. A significant part of the discourse, for example, involved the teacher's telling the pupils about the general nature of the unit to be studied (structuring) and also some discussion among pupils (reacting); but, by and large, the basic pattern of the classroom interaction involved a question-answer sequence which was frequently followed by an evaluative reaction.

Stability of Pedagogical Patterns Over Time

Tables 7 - 14 summarize the distribution of pedagogical moves over the four class sessions included in the experimental unit. These data reveal an astonishing degree of stability over time in the pattern of discourse both for teachers and for pupils.

Tables 7 and 8 present the average percentage of lines and moves in each pedagogical category for the total sample of 15 classes. The similarity of discourse across class sessions is illustrated, for example, by the remarkably restricted range of moves concerned with teachers' solicitations (SOL), which varied from 46.0 per cent to 47.6 per cent, a difference of only 1.6 per cent. Similarly, teacher reactions (REA) varied from 36.0 per cent to 36.8 per cent, a difference of only 0.8 per cent. Pupils showed somewhat greater variability, but again the similarity across sessions is much more striking than the apparent difference. Thus, the percentage of moves devoted to pupils' responding (RES) varied from 59.3 per cent to 68.6 per cent, a difference of only 9.3 per cent.

A more detailed analysis of these data is presented in Tables 9 - 14, which summarize the percentage of lines and moves in each pedagogical category for each class in the four sessions. Once again, the data reveal marked stability over time in the amount of discourse devoted by each class to a given pedagogical category. Consider, for example, the percentage of total moves in Class 1 concerned with teacher's solicitations (Table 9). For sessions 1, 2, 3, and 4, these are 29.2, 30.1,

TABLE 7

AVERAGE PERCENTAGE OF LINES AND MOVES IN EACH PEDAGOGICAL CATEGORY FOR ALL TEACHERS COMBINED BY EACH SESSION AND FOR ALL SESSIONS COMBINED

Pedagogical Move		Session				Unit of Four Sessions
		I	II	III	IV	
SOL	Moves	47.6	46.3	46.3	46.0	46.6
	Lines	30.6	28.0	27.4	26.5	28.2
RES	Moves	5.1	5.1	6.6	5.7	5.6
	Lines	5.9	8.1	8.0	5.8	7.0
STR	Moves	7.3	7.8	7.3	8.9	7.7
	Lines	21.4	23.9	16.1	18.8	20.1
REA	Moves	36.0	36.7	36.7	36.8	36.5
	Lines	27.5	31.4	42.1	42.9	37.0
$\underline{\text{REA}}$	Moves	3.0	3.0	2.5	2.1	2.7
	Lines	9.3	8.2	6.1	5.5	7.4

TABLE 8

AVERAGE PERCENTAGE OF LINES AND MOVES IN EACH PEDAGOGICAL CATEGORY FOR ALL PUPILS COMBINED BY EACH SESSION AND FOR ALL SESSIONS COMBINED

Pedagogical Move		Session				Unit of Four Sessions
		I	II	III	IV	
SOL	Moves	10.1	9.5	13.6	13.2	11.5
	Lines	8.7	8.0	11.8	7.5	9.0
RES	Moves	68.6	66.4	65.5	59.3	65.4
	Lines	65.6	61.2	63.0	41.3	57.4
STR	Moves	0.4	1.3	1.4	1.1	1.1
	Lines	0.8	2.1	2.3	1.0	1.5
STR-A	Moves	0	0.1	0.2	3.1	0.7
	Lines	0	5.7	4.0	27.5	9.7
REA	Moves	14.0	14.3	15.0	17.0	14.9
	Lines	20.5	17.7	16.5	20.1	18.8
$\underline{\text{REA}}$	Moves	0.06	0.06	0	0.1	0.1
	Lines	0.2	0.1	0	0.2	0.1

TABLE 9

PERCENTAGE OF LINES AND MOVES DEVOTED TO SOLICITING BY SESSION FOR TEACHERS AND PUPILS IN EACH OF THE FIFTEEN CLASSES

		Teacher					Pupil				
Class		Session I	II	III	IV	Unit of Four Sessions	Session I	II	III	IV	Unit of Four Sessions
1	Moves	29.2	30.1	30.4	29.8	29.9	0.8	1.2	2.7	2.5	1.7
	Lines	30.8	29.7	26.0	21.5	27.5	0.3	0.7	2.2	2.1	1.2
2	Moves	29.4	29.9	31.6	28.6	29.9	3.1	1.8	3.2	2.2	2.6
	Lines	20.3	22.2	28.0	13.8	20.1	3.0	0.9	1.7	1.0	1.6
3	Moves	41.8	35.1	34.5	33.8	36.6	2.7	2.5	5.2	2.1	3.1
	Lines	41.5	29.4	30.0	17.6	30.1	1.4	1.8	4.2	0.6	2.1
4	Moves	33.1	24.7	32.2	27.4	29.6	1.5	4.1	1.9	6.2	3.1
	Lines	25.1	18.4	18.1	20.4	20.7	1.0	1.9	1.3	3.2	1.8
5	Moves	26.7	21.5	25.8	22.9	24.5	5.9	11.9	7.1	14.3	9.4
	Lines	21.1	13.6	17.0	9.3	15.5	2.8	6.5	5.0	7.8	5.4
6	Moves	33.8	31.7	32.3	37.2	33.7		2.4	4.4	3.5	2.7
	Lines	19.0	16.5	20.9	24.3	20.2		0.7	2.5	1.1	1.1
7	Moves	28.4	18.2	25.5	28.8	25.7	5.3	8.5	8.3	4.1	6.6
	Lines	19.6	7.8	16.2	17.0	15.5	4.0	3.7	5.9	2.4	4.2
8	Moves	28.9	28.9	23.8	25.6	27.6	4.0	4.3	8.8	3.9	4.7
	Lines	21.4	22.8	17.3	18.3	20.4	2.1	4.0	4.7	1.5	2.9
9	Moves	32.7	23.4	30.8	31.0	29.0	1.0	3.6	1.1		1.5
	Lines	12.4	10.7	10.1	17.6	12.8	0.2	0.9	0.2		0.3
10	Moves	30.2	31.3	26.7	22.7	28.3	1.3	2.0	5.6	4.6	3.1
	Lines	15.3	15.5	10.5	6.4	12.0	0.5	0.8	2.7	1.0	1.2
11	Moves	32.3	35.2	34.9	24.6	32.9	1.3	1.9	2.1	8.2	2.6
	Lines	22.6	22.4	33.3	11.1	23.2	0.4	0.7	1.0	1.7	0.9
12	Moves	24.2	23.7	18.1	21.4	21.5	5.3	6.4	11.8	7.3	8.0
	Lines	12.7	12.9	9.8	29.2	16.0	2.6	4.2	5.7	3.3	4.1
13	Moves	32.0	30.9	28.1	32.2	30.8	3.0	2.7	8.6	3.0	4.2
	Lines	37.2	30.3	21.6	28.2	28.9	1.7	1.9	5.5	2.4	3.0
14	Moves	31.7	32.2	27.4	26.0	29.8	3.1	1.3	1.6	6.5	2.7
	Lines	23.1	32.0	18.9	22.2	23.8	2.0	0.5	0.7	1.8	1.3
15	Moves	19.9	26.3	28.8	20.2	24.6	12.0	5.0	3.5	11.0	7.3
	Lines	12.0	17.2	19.5	9.6	14.7	10.6	3.0	2.5	5.1	5.5
$\overline{X}$	Moves	29.7	28.8	28.6	27.8	28.8	3.8	3.6	5.2	5.2	4.4
	Lines	22.5	20.9	20.1	18.1	20.3	2.3	2.0	3.1	2.4	2.5

TABLE 10

PERCENTAGE OF LINES AND MOVES DEVOTED TO RESPONDING BY SESSION FOR TEACHERS AND PUPILS IN EACH OF THE FIFTEEN CLASSES

Class		Teacher Session					Pupil Session				
		I	II	III	IV	Unit of Four Sessions	I	II	III	IV	Unit of Four Sessions
1	Moves	0.5	1.1	2.2	2.0	1.4	34.2	30.4	29.2	24.1	30.1
	Lines	0.3	1.8	1.5	2.0	1.4	19.2	20.2	19.0	12.0	18.0
2	Moves	1.2	1.1	1.6	0.9	1.2	24.7	25.6	30.0	26.3	26.6
	Lines	0.7	0.5	1.9	1.0	1.0	27.4	25.1	27.6	18.3	23.9
3	Moves	2.7	2.9	1.0	1.4	2.1	22.3	25.3	25.8	24.1	24.4
	Lines	4.5	5.4	3.8	0.6	3.7	15.3	19.8	19.7	18.0	18.2
4	Moves	1.8	3.0	0.9	6.7	2.8	29.5	22.9	27.1	15.1	24.6
	Lines	2.0	4.3	1.5	6.8	3.7	35.2	14.6	31.0	18.5	24.8
5	Moves	6.3	10.1	5.0	2.5	5.8	23.6	15.1	17.5	14.3	17.9
	Lines	10.2	21.9	5.9	1.1	9.4	16.0	11.8	15.9	13.0	14.4
6	Moves		2.4	5.6	4.8	3.3	29.2	25.6	27.3	28.3	27.5
	Lines		1.5	10.3	12.0	5.9	11.2	13.7	17.3	15.1	14.3
7	Moves	3.7	8.0	7.9	4.1	5.8	24.7	11.9	21.2	26.0	21.4
	Lines	3.3	6.6	14.6	4.7	7.5	20.2	6.8	12.5	12.1	13.5
8	Moves	4.0	4.1	7.5	3.9	4.4	20.4	26.9	18.4	24.4	22.9
	Lines	5.4	12.7	18.3	2.9	8.8	17.0	17.6	10.2	12.4	15.0
9	Moves	1.0	3.6	2.2		1.7	24.8	21.3	17.6	25.6	22.5
	Lines	0.2	2.4	1.1		0.9	6.3	5.3	4.0	7.5	5.8
10	Moves	0.9	1.6	3.3	4.6	2.4	26.1	25.6	25.0	24.0	25.3
	Lines	0.6	8.8	3.6	7.7	5.3	14.6	12.4	8.8	6.7	10.6
11	Moves	1.3	2.3	2.4	2.7	2.1	26.3	23.2	30.8	23.6	26.7
	Lines	1.2	2.3	2.4	6.0	2.8	10.7	9.5	22.1	9.4	13.4
12	Moves	4.2	5.1	6.9	6.4	5.8	23.2	19.5	14.2	19.2	18.6
	Lines	9.4	6.9	5.1	4.0	6.2	15.1	10.9	7.3	8.0	10.0
13	Moves	3.3	1.8	7.6	2.5	3.7	31.4	30.8	25.3	32.8	30.1
	Lines	3.0	3.4	11.6	5.1	6.1	22.9	25.0	15.1	24.0	21.4
14	Moves	2.1	2.2	1.6	7.3	2.7	24.0	23.8	28.6	23.6	25.2
	Lines	5.3	2.0	2.3	4.0	3.5	14.7	11.6	16.1	9.6	13.0
15	Moves	8.9	4.7	3.3	4.1	5.3	20.1	26.3	28.2	8.1	22.9
	Lines	16.2	11.7	5.4	2.1	9.1	12.4	21.1	23.3	4.6	15.6
$\overline{X}$	Moves	3.2	3.2	4.1	3.5	3.5	26.8	25.1	25.1	23.4	25.0
	Lines	4.3	6.0	5.9	3.9	5.0	17.3	15.5	16.7	13.1	15.6

TABLE 11

PERCENTAGE OF LINES AND MOVES DEVOTED TO STRUCTURING BY SESSION

FOR TEACHERS AND PUPILS IN EACH OF THE FIFTEEN CLASSES

Class		Teacher Session					Pupil Session				
		I	II	III	IV	Unit of Four Sessions	I	II	III	IV	Unit of Four Sessions
1	Moves	2.9	2.3	1.7	4.1	2.6		0.5	0.7		0.4
	Lines	7.6	10.1	3.3	7.1	7.2		0.4	1.0		0.4
2	Moves	3.1	3.9	6.1	6.3	4.8	0.8	0.4	1.8		0.7
	Lines	9.6	11.5	13.3	10.9	11.2	1.4	0.6	0.9		0.8
3	Moves	5.9	9.0	6.2	6.2	7.0		0.4	0.5		0.3
	Lines	14.8	11.7	5.7	8.4	10.1		0.8	0.1		0.2
4	Moves	4.6	2.6	5.6	3.9	4.1	0.3			1.7	0.4
	Lines	5.1	8.2	6.1	4.2	5.9	1.3			0.8	0.6
5	Moves	4.9	5.5	6.7	3.7	5.2		0.9	0.7		0.4
	Lines	20.9	12.6	19.2	7.8	15.5		0.8	1.0		0.5
6	Moves	3.1	6.1	2.5	2.8	3.7		0.6			0.2
	Lines	24.3	27.8	7.3	5.3	16.2		0.2			0.04
7	Moves	5.9	11.4	6.5	10.3	7.8		6.3	1.8		1.7
	Lines	14.7	45.5	17.8	23.4	24.0		6.8	3.0		2.4
8	Moves	2.7	4.3	4.8	3.9	3.7	0.5	0.3	0.7		0.4
	Lines	9.7	7.7	7.5	9.7	8.8	0.5	0.1	0.6		0.3
9	Moves	13.9	14.2	13.2	11.6	13.2					
	Lines	51.3	51.9	48.8	35.3	46.6					
10	Moves	5.0	4.9	3.9	9.1	5.5			0.6		0.1
	Lines	15.5	24.3	9.1	28.7	19.7			0.1		0.03
11	Moves	11.6	10.2	5.8	6.4	8.6		0.5		1.8	0.4
	Lines	30.7	31.6	14.4	12.6	22.4		0.4		1.8	0.5
12	Moves	10.0	4.2	6.3	9.4	7.3				0.4	0.1
	Lines	30.7	13.9	21.1	24.1	22.0				0.3	0.1
13	Moves	1.3	1.2	1.3	0.8	1.2			1.3	0.2	0.4
	Lines	1.7	1.3	2.4	1.2	1.7			2.1	0.2	0.7
14	Moves	1.7	6.2	5.7	5.7	4.5					
	Lines	6.2	17.7	7.6	2.0	8.0					
15	Moves	3.8	3.2	2.5	6.9	3.6	0.2		0.6	1.2	0.4
	Lines	11.6	6.9	6.7	9.0	8.7	0.1		0.4	0.3	0.2
$\bar{X}$	Moves	4.5	4.8	4.5	5.4	4.8	0.1	0.5	0.5	0.4	0.4
	Lines	15.8	17.8	11.8	12.8	14.5	0.2	0.5	0.6	0.3	0.4

TABLE 12

PERCENTAGE OF LINES AND MOVES DEVOTED TO STRUCTURING-ASSIGNED BY SESSION FOR PUPILS IN EACH OF THE FIFTEEN CLASSES

Class		Session				Unit of Four Sessions
		I	II	III	IV	
1	Moves					
	Lines					
2	Moves					
	Lines					
3	Moves				6.9	1.2
	Lines				28.7	6.3
4	Moves		0.4			0.1
	Lines		17.7			4.8
5	Moves				5.3	1.2
	Lines				25.4	6.1
6	Moves					
	Lines					
7	Moves				1.4	0.2
	Lines				17.3	3.3
8	Moves					
	Lines					
9	Moves					
	Lines					
10	Moves					
	Lines					
11	Moves				5.5	0.7
	Lines				46.6	9.8
12	Moves			0.4		0.1
	Lines			10.3		3.1
13	Moves					
	Lines					
14	Moves		0.4	0.8	1.6	0.6
	Lines		5.2	5.1	7.3	4.3
15	Moves				1.7	0.2
	Lines				16.6	3.6
$\overline{X}$	Moves		0.04	0.1	1.2	0.3
	Lines		1.4	1.0	8.7	2.6

TABLE 13

PERCENTAGE OF LINES AND MOVES DEVOTED TO REACTING BY SESSION FOR TEACHERS AND PUPILS IN EACH OF THE FIFTEEN CLASSES

		Teacher					Pupil				
		Session				Unit of Four Sessions	Session				Unit of Four Sessions
Class		I	II	III	IV		I	II	III	IV	
1	Moves	27.4	23.5	25.4	26.1	25.3	1.8	4.3	3.9	2.9	3.4
	Lines	36.9	27.3	42.2	44.4	36.9	1.6	3.4	2.7	1.3	2.3
2	Moves	16.9	19.9	21.9	25.0	20.8	12.6	9.6	2.4	4.5	7.5
	Lines	9.6	13.3	20.4	49.8	25.5	19.0	17.4	2.4	2.6	10.2
3	Moves	18.6	18.4	18.6	20.0	18.8	4.1	2.9	5.2	2.8	3.7
	Lines	20.0	24.0	27.3	19.8	22.9	1.9	2.4	3.9	1.6	2.5
4	Moves	22.8	24.7	23.4	22.9	23.5	3.0	14.4	6.1	12.9	8.6
	Lines	22.1	18.8	29.1	38.9	26.7	3.5	10.2	8.7	6.2	7.0
5	Moves	22.2	20.6	24.2	13.5	20.4	3.1	8.7	9.7	15.5	9.1
	Lines	16.4	19.9	24.3	8.0	17.3	4.1	7.1	10.3	21.8	10.7
6	Moves	22.3	22.0	20.5	17.9	20.7	0.8	2.4	4.4	2.1	2.5
	Lines	25.6	16.5	26.4	33.2	25.5	0.2	1.1	3.8	1.1	1.6
7	Moves	23.5	21.6	22.7	21.2	22.5	5.9	6.3	4.7	1.4	4.9
	Lines	25.9	15.4	26.0	18.4	22.2	7.3	4.5	2.7	0.5	4.1
8	Moves	22.6	23.1	22.5	26.1	23.5	9.7	5.5	7.5	9.0	8.0
	Lines	27.1	26.7	30.3	39.3	30.5	10.7	3.8	4.3	8.6	7.3
9	Moves	22.8	24.1	28.6	27.9	25.8	3.0	6.4	1.1		2.8
	Lines	27.1	21.9	34.4	36.0	29.5	1.4	1.5	0.5		0.9
10	Moves	21.2	23.6	24.4	25.3	23.4	7.7	1.6	6.7	7.1	5.5
	Lines	24.7	29.2	50.7	35.4	34.7	15.0	0.6	3.2	5.1	5.9
11	Moves	22.4	21.8	18.8	20.0	20.7	0.4		2.4	2.7	1.3
	Lines	21.8	23.1	19.3	6.6	18.2	0.4		2.1	2.2	1.2
12	Moves	21.6	22.0	20.1	21.8	21.3	7.9	7.6	15.6	12.0	11.2
	Lines	18.3	33.1	26.6	21.9	25.3	3.8	9.0	10.5	7.1	7.9
13	Moves	21.7	23.4	19.2	23.2	22.0	2.6	4.2	5.6	3.0	3.9
	Lines	21.8	23.2	31.6	33.2	27.5	1.6	3.5	4.3	3.3	3.3
14	Moves	25.1	26.9	26.2	25.2	25.9	2.1	0.4	2.4		1.5
	Lines	25.4	27.8	36.7	23.7	28.3	1.1	0.3	1.1		0.6
15	Moves	22.8	24.5	25.0	15.0	23.0	10.3	7.6	5.8	19.7	9.2
	Lines	28.4	24.5	33.7	5.6	24.2	7.0	5.5	4.7	28.9	10.8
$\overline{X}$	Moves	22.5	22.8	22.6	22.3	22.6	5.3	5.4	5.7	6.7	5.7
	Lines	20.3	23.4	30.9	29.4	26.7	5.4	4.5	4.4	6.4	5.1

TABLE 14

PERCENTAGE OF LINES AND MOVES DEVOTED TO REACTING-UNDERLINED BY SESSION FOR TEACHERS AND PUPILS IN EACH OF THE FIFTEEN CLASSES

Class		Teacher Session				Unit of Four Sessions	Pupil Session				Unit of Four Sessions
		I	II	III	IV		I	II	III	IV	
1	Moves	1.0	0.7	0.7	1.6	0.9					
	Lines	2.4	3.2	0.7	7.0	3.1					
2	Moves	1.2	1.8	2.0	1.3	1.6	0.4	0.4			0.2
	Lines	4.5	5.1	4.3	0.8	3.4	0.9	0.6			0.4
3	Moves		1.2	2.1	2.1	1.2					
	Lines		3.8	5.1	4.6	3.3					
4	Moves	1.2	2.2	1.4		1.3					
	Lines	3.8	5.6	3.6		3.3					
5	Moves	3.5	1.8	0.3	0.8	1.6				0.4	0.1
	Lines	7.1	4.3	0.3	1.9	3.4				0.7	0.2
6	Moves	3.1	4.3	2.5	1.4	2.8					
	Lines	18.1	20.6	11.4	7.4	14.4					
7	Moves	2.2	0.6	0.4	0.7	1.1					
	Lines	4.8	0.2	0.8	3.6	2.4					
8	Moves	1.5	1.2	3.4	1.7	1.7					
	Lines	3.4	3.4	5.3	6.9	4.5					
9	Moves	1.0	3.6	1.1	2.3	2.1					
	Lines	1.3	5.4	0.2	3.5	2.8					
10	Moves	1.8	1.2	3.3	2.6	2.1					
	Lines	11.7	6.1	11.2	9.2	9.4					
11	Moves	3.0	2.8	1.4	1.8	2.2					
	Lines	11.5	8.6	5.1	1.7	6.8					
12	Moves	2.1	1.7	0.4	0.4	1.1					
	Lines	6.8	5.4	1.0	1.2	3.3					
13	Moves	2.6	3.3	2.2	0.8	2.3					
	Lines	8.8	10.4	5.4	1.3	6.6					
14	Moves	3.5	0.9	3.2	1.6	2.5					
	Lines	19.0	0.9	10.1	2.6	8.5					
15	Moves	0.7	1.8	1.1	1.2	1.2					
	Lines	1.3	10.0	3.0	3.4	4.0					
$\bar{X}$	Moves	1.9	1.9	1.5	1.3	1.7	0.02	0.02		0.03	0.02
	Lines	6.8	6.1	4.5	3.7	5.3	0.05	0.03		0.05	0.03

30.4, and 29.8 respectively. For Class 2, the percentages are 29.4, 29.9, 31.6 and 28.6. For pupils' responding (Table 10), the parallel results for the four sessions of Class 1 are 34.2, 30.4, 29.2, 24.1. For Class 2, the results are 24.7, 25.6, 30.0, 26.3.

In every pedagogical category for almost all classes, the same pattern of similarity among sessions is found in the data. Among some classes the final class sessions shows some deviation from the earlier sessions, probably because there were occasional debates or pupil reports in the final session; but, by and large, the amount of teacher and pupil activity in each pedagogical category for a particular class remained constant from session to session.

On the basis of these data, it seems reasonable to conclude that classes display a characteristic style of pedagogical discourse which is stable over time, at least insofar as the limited number of sessions considered in this study is concerned. While there is no basis for generalizing these findings to longer periods of time, the data strongly suggest the hypothesis that teacher-pupil interaction within various classes is characterized by particular patterns of pedagogical discourse; and notwithstanding occasional deviations, these classroom patterns of discourse remain relatively stable over time.

TEACHING CYCLES

Analysis of the data in terms of teaching cycles provides a basis for viewing sequences of pedagogical moves in the course of teacher-pupil interaction. The analysis of teaching cycles focused on three dimensions of classroom discourse: rate, source, and pattern (7).

Rate

Rate was described in terms of the cycle activity index, the number of cycles per minute of actual class time. This measure is not substantially related to rate of speech, but to the rate at which verbal interchanges take place in the classroom. These data are summarized in Table 15. A high index, as in the case of Teachers 1 and 13, indicates a rapid flow of discourse; a low index, as in the case of Teachers 9 and 14, indicates low cycle activity. Considerable variability was found among these 15 teachers in this aspect of verbal activity. The range of cycle activity indexes was from 0.9 (less than one cycle per minute of class time) to three (an average of three cycles per minute). The mean and the median for the group was 1.8. Over the first three sessions, the mean cycle activity index remained remarkably constant at 1.9. The drop to 1.4 in the fourth session was probably related to the fact that several of the teachers scheduled reports or debates for that session. Since these activities usually involved long pedagogical moves, the rate of verbal interchange tended to decline.

Source

The second factor in teaching cycle analysis is source; that is, who, teacher or pupil, initiates a given cycle of verbal activity. Source was described in terms of the percentage of teacher-initiated teaching cycles. These data are summarized in Table 16. Of the 4592 teaching cycles in the 60 class sessions, 84.8 per cent were teacher-initiated; by and large, it was the teacher who delivered the structuring or soliciting move that initiated the teaching cycle. In only one of the sessions

TABLE 15

CYCLE ACTIVITY INDEXES FOR EACH OF FIFTEEN CLASSES AND FOR ALL CLASSES COMBINED

Class	Session I	Session II	Session III	Session IV	Unit of Four Sessions
1	2.4	3.8	2.9	2.2	2.9
2	1.8	1.8	2.3	1.5	1.9
3	1.9	2.1	1.3	1.2	1.6
4	2.5	1.8	1.8	1.4	1.9
5	1.7	2.0	1.8	1.8	1.8
6	1.0	1.2	1.2	1.2	1.2
7	2.1	1.4	2.2	1.7	1.8
8	2.3	2.3	1.5	1.5	1.9
9	.9	.9	1.0	.9	.9
10	1.2	1.5	1.4	.9	1.2
11	1.7	1.7	2.4	.9	1.6
12	1.5	1.5	1.6	1.6	1.6
13	2.7	3.4	2.8	3.0	3.0
14	1.5	1.3	1.1	.6	1.1
15	2.7	2.9	3.4	1.3	2.6
$\bar{X}$	1.9	1.9	1.9	1.4	1.8

TABLE 16

PERCENTAGE DISTRIBUTION OF TEACHER INITIATED CYCLES FOR EACH OF FIFTEEN CLASSES AND FOR ALL CLASSES COMBINED

	Session				Unit of
Class	I	II	III	IV	Four Sessions
1	97.1	93.4	90.6	90.9	93.1
2	87.1	91.7	91.1	89.8	90.0
3	94.6	93.5	86.6	74.5	89.3
4	93.8	80.3	94.5	79.6	88.0
5	80.0	56.9	71.6	39.0	61.6
6	100.0	90.2	87.0	92.7	92.1
7	84.6	60.9	73.7	85.4	77.4
8	82.1	84.6	72.1	86.7	82.4
9	100.0	92.5	100.0	93.9	96.6
10	95.1	92.0	79.3	85.4	88.5
11	98.7	96.1	93.9	67.6	92.4
12	78.0	73.7	63.1	76.6	72.1
13	89.6	92.6	75.5	91.6	87.4
14	86.6	92.9	87.9	74.4	86.8
15	59.6	84.0	87.6	60.3	75.1
$\overline{X}$	87.3	87.2	83.4	79.7	84.8

(Teacher 5's fourth session), did the percentage of pupil-initiated cycles exceed teacher-initiated cycles. In three of the sessions (Teacher 6's first and Teacher 9's first and third), there were no pupil-initiated teaching cycles.

Over the unit of four sessions, there was again considerable variability among the 15 teachers. The range was from Teacher 9's 96.6 per cent to Teacher 5's 61.6 per cent. The median was 88 per cent. The mean percentages of teacher-initiated teaching cycles remained constant over the first two sessions at about 87 per cent, but dropped to 83.4 per cent in the third session and 79.7 per cent in the fourth. This indicates a tendency for pupils to structure and solicit more as the unit progressed. The lower incidence of teacher-initiated teaching cycles in the fourth session was probably due in part to the pupil reports and debates which took place in several of the classes.

Pattern

The third factor in the analysis is pattern, which refers to distinctive sequences of pedagogical moves. Pattern is described in terms of the percentage distribution of the 21 cycle types. Of the 21 types, six accounted for approximately 80 per cent of the total number of teaching cycles for all 15 classes combined. These are cycle 18 (SOL RES REA), which accounted for 26 per cent of all cycles; cycle 14 (SOL RES), which accounted for 22.3 per cent; cycle 13 (SOL), which accounted for 9.7 per cent; cycle 19, (SOL RES REA REA...), which accounted for nine per cent; cycle 21 (SOL REA RES...REA...), which accounted for seven per cent; and cycle 9 (STR SOL RES REA), which accounted for 5.7 per cent. None of the other 15 cycles accounted for as much as five per cent of the total.

The percentage distribution of these six major cycles, along with a seventh category comprising all other cycles, is presented in Table 17. Cycle 18 (SOL RES REA) and cycle 14 (SOL RES) ranked highest in frequency of occurrence for all teachers with the exception of Teacher 9. For the group as a whole, these two cycles alone accounted for nearly half of all the teaching cycles.

Cycle 14 (SOL RES) may be seen as a basic pattern in almost all of the verbal interchange in these classrooms. This interchange, however, is modifiable in three ways. First, a reacting move may, and very frequently does, follow the response. Comparison of cycle 18 (SOL RES REA) and cycle 14 (SOL RES) in Table 17 indicates that the extent to which this occurred in the experimental group differed considerably from class to class. Second, a structuring move may precede the solicitation. Some teachers, such as Teacher 9, follow this pattern consistently; others, such as Teacher 13, structure very infrequently. The third major kind of modification involves solicitations which elicit multiple responses or which involve multiple reactions. The distribution of cycle 19 (SOL RES REA REA...) and cycle 21 (SOL RES REA RES... REA...) in Table 17 again indicates considerable variability among these teachers. All three modifications may, of course, occur in combination. A teacher, for example, may structure and react to the same question-answer sequence.

Teaching Styles

One may infer from these data that while all classes (with the possible exception of Class 9) engaged primarily in questioning and

TABLE 17

PERCENTAGE DISTRIBUTION OF CYCLE PATTERNS FOR EACH OF FIFTEEN CLASSES AND FOR ALL CLASSES COMBINED

Class	SOL RES REA	SOL RES	SOL	SOL RES REA REA...	SOL RES REA RES... REA...	STR SOL RES REA	All Other Cycles	Total All Cycles
1	39.7	20.8	6.1	7.6	7.4	3.6	14.8	100.
2	19.6	24.0	11.1	7.5	9.6	3.9	24.3	100.
3	18.7	23.0	20.3	6.7	2.0	6.3	23.0	100.
4	22.5	20.2	12.4	10.9	8.6	5.6	19.8	100.
5	13.6	19.7	11.5	10.0	8.6	6.8	29.8	100.
6	28.0	35.5	6.9	8.4	3.4	3.9	13.9	100.
7	25.6	18.9	2.6	9.4	4.5	9.1	29.9	100.
8	30.7	22.4	7.3	14.4	5.4	3.8	16.0	100.
9	30.4	7.4	4.7	6.1	4.7	17.6	29.1	100.
10	26.4	25.5	4.7	10.6	8.5	8.1	16.2	100.
11	33.0	17.7	9.7	5.2	2.1	13.9	18.4	100.
12	14.2	22.7	9.7	11.7	4.9	9.7	27.1	100.
13	26.0	28.2	13.7	8.8	10.2	1.0	12.1	100.
14	31.5	15.2	9.3	6.2	12.1	5.8	19.9	100.
15	23.2	23.4	8.6	10.6	7.1	2.0	25.1	100.
$\overline{X}$	26.0	22.3	9.7	9.0	7.0	5.7	20.3	100.

answering, the teachers did vary in the extent to which they modified the basic question-answer interchange. As a matter of fact, considerable variability was evident in all three of the dimensions of teaching cycle analysis. This suggests that styles of pedagogical discourse can be described in terms of cycle activity, percentage of teacher-initiated cycles, and distribution of cycle types. The factors of rate, source, and pattern provide the basis for a kind of typology of classroom discourse which is useful in identifying distinctive modes of linguistic behavior and comparing individual teaching styles. Teachers 2 and 4, for example, are probably most alike in teaching style. Both had the same cycle activity index, a moderate 1.9 (Table 15). They also had comparable percentages of teacher-initiated cycles in the moderate to high range (Table 16). With respect to pattern, these teachers differed only slightly in their relative use of cycle 14 (SOL RES) and cycle 18 (SOL RES REA). Reactions were somewhat more likely to follow responses in Teacher 4's class than in Teacher 2's class. Table 17 indicates that the percentages for cycles 18 (SOL RES REA) and 14 (SOL RES) in Teacher 2's sessions were 19.6 and 24.0, while in Teacher 4's they were 22.5 and 20.2. The higher incidence of cycle 19 (SOL RES REA REA...) in Teacher 4's sessions also indicates a greater tendency for reactions to follow reactions in his sessions than in Teacher 2's. Nevertheless, the styles of discourse in Teacher 2's and Teacher 4's sessions may be described as basically similar.

Teaching cycle analysis may be used to describe differences, as well as similarities, among teaching styles. Teachers 1 and 13, for example, have extremely high cycle activity indexes (Table 15). In this respect, therefore, they are alike. Teacher 1's percentage of teacher-initiated teaching cycles (Table 16) is 93.1 as compared with Teacher 13's 87.4 per cent. This indicates only a moderate difference. Table 17, however, shows a striking contrast in the ratio of cycle 18 (SOL RES REA) to cycle 14 (SOL RES), a measure of the extent to which a solicitation-response interchange is likely to be followed by a reaction. For Teacher 1 the ratio was 2 to 1, whereas for Teacher 13 it was 1 to 1. These data indicate, therefore, that reactions to responses are about twice as likely to occur in Class 1 as in Class 13.

Two complementary conclusions may be drawn from the teaching cycle data. The first is that the 15 teachers did not deviate radically from a general teaching pattern which consisted basically of asking questions and receiving answers. Cycle 14 (SOL RES) and its simplest modification cycle 18 (SOL RES REA) alone accounted for over 48 per cent of all cycles. In addition, the question-answer interchange formed the core of most of the other major teaching cycles. The second conclusion is that within the basic design there was still considerable variability. This variability may be described in terms of the rate at which verbal interchanges take place, the extent of teacher-initiation of teaching cycles, and the manner in which the basic solicitation-response unit is modified.

SUBSTANTIVE MEANINGS

In the instructions given before the experimental unit, teachers were encouraged to use teaching techniques and procedures they would normally follow. In spite of these instructions, the 15 teachers sampled showed a remarkable similarity in the ratio of teacher-pupil activity and in the frequency of each pedagogical move contained in the classroom discourse. In most cases, a majority of the teachers clustered within a small range of only a few per cent.

In contrast to the freedom permitted in using teaching techniques, the major restriction placed upon the teachers for experimental purposes involved the substantive unit of instruction on international trade. Although teachers were urged to teach in any way they chose, they were unequivocally directed and limited in the subject matter to be covered during the experimental class sessions. In view of these limitations, it is remarkable that the data for the substantive meanings covered in the classroom reveal the greatest variability among teachers. While teachers structured, solicited, and reacted about the same proportion of lines in every classroom, they showed marked differences in the substantive material covered in the class sessions.

Substantive Meanings Dealing with International Trade

All teachers devoted a fair proportion of time to a general discussion of trade and to topics specifically related to international trade. Except for this central feature common to all classes, the substantive emphasis in each class differed from all other classes. This is illustrated by the following kinds of differences as shown in Table 18: Class 1 spent 23.5 per cent of the total discourse on imports and exports; Class 2 devoted only 5.8 per cent to this category; and Class 15 dealt with imports-exports only one half of one per cent of the time. Thus the difference between Class 1 and Class 15, two classes presumably dealing with the same substantive material, was 23 per cent.

TABLE 18

PERCENTAGE OF LINES AND MOVES IN EACH SUBSTANTIVE CATEGORY FOR EACH OF THE FIFTEEN CLASSES, FOR ALL CLASSES AND FOR ALL CATEGORIES COMBINED

Class		PFT	TRA	IMX	FSP	BAR	FOR	REL	NTR	Total Substantive
1	Moves	4.4	20.1	29.0	10.7	16.6	11.5	1.4	1.7	95.4
	Lines	4.7	19.3	23.5	12.0	21.4	11.3	1.4	1.7	95.3
2	Moves	9.2	26.6	8.1	15.8	19.6	7.5	2.1	5.3	94.2
	Lines	12.3	23.4	5.8	12.5	27.5	7.7	1.7	5.7	96.6
3	Moves	11.4	34.8	8.7	5.4	13.1	9.6	6.8	4.9	94.7
	Lines	10.8	39.5	10.9	4.3	11.5	9.6	4.7	6.1	97.4
4	Moves	6.9	52.6	7.2	6.8	10.9	8.1	0	1.2	93.7
	Lines	10.1	50.4	5.4	5.9	13.2	8.1	0	1.0	94.1
5	Moves	23.7	25.1	5.5	6.7	8.5	16.0	9.5	0.2	95.2
	Lines	25.9	25.7	5.6	7.9	8.2	15.3	8.9	0.5	98.0
6	Moves	18.5	19.0	16.5	26.0	12.2	0	1.5	0	93.7
	Lines	21.3	23.9	15.1	21.4	10.2	0	5.2	0	97.1
7	Moves	22.1	8.7	17.2	8.8	16.5	2.7	8.9	12.8	97.7
	Lines	30.4	10.3	16.3	7.1	14.1	2.7	6.3	11.7	98.9
8	Moves	19.5	21.2	10.6	23.7	13.3	8.2	0	0.1	96.6
	Lines	21.9	22.3	9.5	19.1	17.3	7.5	0	0.8	98.4
9	Moves	10.4	22.5	7.1	16.4	23.1	18.8	0	0	98.3
	Lines	11.9	24.1	8.1	17.0	13.8	24.4	0	0	99.3
10	Moves	5.5	42.9	8.4	23.3	4.7	4.7	5.4	0	94.9
	Lines	6.2	41.8	11.0	22.9	6.4	5.4	4.4	0	98.1
11	Moves	17.4	20.8	8.6	17.2	16.0	9.0	8.4	0.4	97.8
	Lines	18.7	26.5	5.7	16.3	16.5	6.7	8.3	0.2	98.9
12	Moves	7.1	44.5	1.4	0.1	13.0	5.3	10.7	12.1	94.2
	Lines	8.4	45.5	0.7	0.6	11.4	5.8	17.4	7.7	97.5
13	Moves	3.0	15.1	13.2	29.6	18.4	9.0	3.4	6.3	98.0
	Lines	3.6	17.7	11.7	28.0	18.8	8.4	2.0	8.7	98.9
14	Moves	28.6	26.8	15.5	10.5	9.0	0	3.6	0.1	94.1
	Lines	38.4	27.2	14.5	7.0	5.9	0	4.3	0.03	97.3
15	Moves	16.8	13.1	0.8	16.3	13.5	17.4	15.8	4.5	98.2
	Lines	24.5	17.2	0.5	15.0	12.1	13.8	11.6	4.3	99.0
$\overline{X}$	Moves	12.7	25.0	11.2	15.1	14.1	8.9	5.3	3.6	95.9
	Lines	16.2	27.2	9.8	13.8	14.1	8.6	4.9	3.1	97.7

This is not the only difference noted in the data. Class 2, for example, devoted 27.5 per cent of the lines to a discussion of trade barriers, while Class 10 devoted only 6.4 per cent of the lines to this category -- a difference of 21.1 per cent. Similarly, Class 13 devoted 28 per cent of the lines to specialization, while Class 3 devoted 4.3 per cent of the lines to this topic.

Even more striking was the difference found in the amount of time devoted to discussion of free trade. In a sense, free international trade was the major focus of the entire pamphlet. The material on general trade topics was presented in the pamphlet primarily as a way of leading up to a discussion of free trade. This was clear not only in the pamphlet that the students read but also in the teacher's manual. Some classes, however, such as Class 2, emphasized trade barriers rather than free trade. Others devoted a relatively large proportion of the time to a discussion of free trade. Class 14, for example, devoted 38.4 per cent of the lines to a discussion of free trade, while Class 1 devoted only 4.7 per cent of the class discussion to this category -- a difference of approximately 34 per cent!

From an economist's point of view, a central point of the pamphlet was a discussion of the pros and cons of free trade. The teachers, given the same teaching unit to cover during the experimental class sessions, might reasonably be expected to cover at least these two areas in about the same proportions; but this was not the case. It almost seems as if the teachers were covering a different unit on international trade. Teacher 1 focused on trade barriers (21.4 per cent) with much less of the discussion devoted to free trade (4.7 per cent). In exactly the reverse order, Teacher 5 devoted 25.9 per cent of the discussion to free trade and only 8.2 per cent to trade barriers. From another point of view, Teacher 10 devoted relatively little discussion to either free trade (6.2 per cent) or trade barriers (6.4 per cent). For Teacher 10's class, therefore, the unit was not primarily devoted to international free trade and problems of trade barriers, but was instead devoted to a more general discussion of trade and international trade.

As indicated earlier, most of the classes spent a good deal of time discussing general economic principles of trade. This may well be a function of the fact that for most classes this was an introduction to the study of economics. But even here there were widespread differences. Class 4 devoted 50.4 per cent, over half of the discussion contained in the entire unit, to general principles of trade, while Class 7 devoted only 10.3 per cent to this category -- a difference of 40 per cent. These differences may be a function of the different amounts of knowledge with which students in various classes began the unit, as well as a function of the different amounts of knowledge and interests of the 15 teachers. Nevertheless, the differences in the substantive area, particularly in relation to the similarities found in the pedagogical area, are remarkable.

Relevant and Irrelevant Substantive Meanings

The categories of related material (REL) and not trade (NTR), as distinct from specific substantive topics included in the teaching unit, also offer some interesting comparisons among teachers. Three of the teachers never discussed topics coded as "related material" (REL). These teachers were almost always on the immediate target of the subject matter contained in the teaching unit. Others devoted a good deal of the ti e to related material. Teacher 15, for example, seemed to have difficulty focusing directly on the subject matter; 11.6 per cent of his class discussion was on related matters. Even less often on target was Teacher 12, who devoted 17.4 per cent to related material; for his class, therefore, nearly a fifth of the total discourse was somewhat off the precise substantive focus of the unit. When considered in conjunction with the 7.7 per cent of Class 12's discussion on "not trade (NTR), it is clear that approximately one quarter of the discussion in this class was not directly concerned with international trade.

These results are in marked contrast with the results of those teachers who closely restricted the discussion to the substantive material of the unit. Three of the teachers never discussed anything other than the topics presented in the pamphlet. Five other teachers devoted less than one per cent of the class discussion to topics other than international trade. Class 7, however, spent 11.7 per cent of the discussion on substantive meanings not directly related to international trade, and Class 13 devoted 8.7 per cent to such meanings.

Therefore, just as there were striking differences in the pattern of emphasis within the categories covered by the unit, such as imports-exports and specialization, there were also large differences in the degree to which teachers stayed on the immediate target of the unit. Some teachers devoted relatively large amounts of discussion to related topics, hovering about the target but not quite hitting it. Others simply wandered off in all direction. Paradoxically, in the one area in which the research design imposed major restraints by giving the teachers a specific unit to teach, one finds the greatest differences among teachers.

SUBSTANTIVE-LOGICAL MEANINGS

The percentage of lines contained in the substantive-logical category provides some idea of the amount of discussion devoted specifically to substantive material. This is because substantive entries were made even when the statement contained primarily instructional content, according to the context of the major ongoing substantive discussion. Therefore, the amount of lines contained in the substantive code does not provide an accurate measure of discourse devoted to substantive matters. Whenever there was some explicit discussion of substantive material, however, an entry was made in the substantive-logical category. The results summarized in Table 19 indicate that most of the classroom discussion contained entries in the substantive-logical category, and on this basis it may be inferred that by far the greatest part of the discussion in all classes involved substantive and substantive-logical meanings. There was, however, some variability among classes indicated by a range of lines in the substantive-logical category from a low of 61.9 per cent to a high of 88.5 with a median of 70.8 per cent.

Empirical Meanings

The results in Table 19 show that the largest proportion of lines concerned empirical meanings, that is, explaining and fact stating. This is illustrated by the fact that the median percentage of lines devoted to empirical meanings was 60.3, while for evaluative meanings the median was

TABLE 19

PERCENTAGE OF LINES AND MOVES IN EACH SUBSTANTIVE-LOGICAL CATEGORY FOR EACH OF THE FIFTEEN CLASSES, FOR ALL CLASSES AND FOR ALL CATEGORIES COMBINED

Class		ANALYTIC			EMPIRICAL			EVALUATIVE			Not Clear	Total Substantive-Logical
		DEF	INT	Total	FAC	XPL	Total	OPN	JUS	Total		
1	Move	8.3	1.7	10.0	32.9	19.7	52.6	2.3	1.4	3.7	0	66.3
	Lines	6.1	1.8	7.9	23.1	33.6	56.7	2.2	4.0	6.2	0	70.8
2	Moves	4.7	0.7	5.4	15.2	30.1	45.3	2.7	4.0	6.7	0	57.4
	Lines	3.4	1.5	4.9	9.8	36.7	46.5	2.7	7.8	10.5	0	61.9
3	Moves	4.6	1.2	5.8	17.7	26.0	43.7	1.0	2.0	3.0	0	52.5
	Lines	3.5	0.03	3.5	10.5	43.6	54.1	0.7	4.1	4.8	0	62.4
4	Moves	9.4	0.9	10.3	16.5	26.7	43.2	1.1	1.9	3.0	0.1	56.6
	Lines	8.3	1.8	10.1	12.3	42.3	54.6	0.8	4.7	5.5	0.04	70.2
5	Moves	7.8	1.8	9.6	10.3	23.0	33.3	2.9	5.9	8.8	0	51.7
	Lines	6.8	1.1	7.9	6.9	37.9	44.8	1.5	12.9	14.4	0	67.1
6	Moves	8.5	2.2	10.7	13.8	41.8	55.6	1.8	0.8	2.6	0	68.9
	Lines	3.4	1.4	4.8	6.3	59.9	66.2	1.4	5.3	6.7	0	77.7
7	Moves	7.7	0.7	8.4	27.8	26.5	54.3	1.5	1.5	3.0	0	65.7
	Lines	5.0	0.4	5.4	20.8	41.3	62.1	1.4	4.1	5.5	0	73.0
8	Moves	4.1	0.7	4.8	25.0	32.5	57.5	3.0	3.1	6.1	0.1	68.5
	Lines	2.9	0.5	3.4	17.8	43.6	61.4	3.0	8.8	11.8	0.03	76.6
9	Moves	11.9	0	11.9	16.7	50.7	67.4	0.9	2.4	3.3	0	82.6
	Lines	7.0	0	7.0	6.7	63.3	70.0	0.2	11.3	11.5	0	88.5
10	Moves	6.6	0	6.6	19.6	40.8	60.4	1.4	1.9	3.3	0.1	70.4
	Lines	2.9	0	2.9	9.4	63.7	73.1	0.8	5.3	6.1	0.1	82.1
11	Moves	9.3	0.2	9.5	27.1	25.8	52.9	4.5	2.4	6.9	0.1	69.4
	Lines	4.9	0.1	5.0	16.3	44.0	60.3	3.1	7.5	10.6	0.03	75.9
12	Moves	3.9	0	3.9	24.4	28.9	53.3	5.5	1.6	7.1	0.3	64.6
	Lines	3.7	0	3.7	15.6	47.5	63.1	4.2	2.9	7.1	0.1	74.0
13	Moves	6.5	0.1	6.6	30.4	23.4	53.8	0.8	0.2	1.0	0.2	61.6
	Lines	5.0	0.1	5.1	25.1	38.8	63.9	0.9	0.7	1.6	0.1	70.7
14	Moves	9.6	1.9	11.5	11.1	37.4	48.5	1.2	0.9	2.1	0.1	62.2
	Lines	7.4	1.4	8.8	5.7	51.5	57.2	0.7	1.3	2.0	0.03	68.0
15	Moves	5.1	0.6	5.7	20.0	29.0	49.0	1.9	2.2	4.1	0.4	59.2
	Lines	3.6	0.6	4.2	12.9	42.4	55.3	1.2	8.7	9.9	0.2	69.6
$\overline{X}$	Moves	6.9	0.8	7.7	22.0	28.8	50.8	2.1	2.1	4.2	0.1	62.9
	Lines	4.9	0.7	5.6	13.6	45.9	59.5	1.6	5.9	7.5	0.04	72.8

only 7.1, and for analytic meanings only 5.0. Roughly 12 times as many lines were devoted to explaining and fact stating than either to the evaluative meanings involved in opining and justifying or to the analytic meanings involved in defining and interpreting. In another substantive area, such as English literature, one might find a different pattern of substantive-logical meanings. At any rate, for the present data the proportion of lines devoted to empirical meanings ranged from a low of 44.8 per cent to a high of 73.1 with a median of 60.3 per cent. It is also noteworthy that the range among teachers was not very wide. Ten of the 15 teachers are included in the range between 54 and 64 per cent of the lines concerned with empirical meanings.

Evaluative Meanings

In most classes, very little of the discourse involved evaluative meanings. In terms of proportion of total lines, the range of evaluative meanings was from 1.6 to 14.4 per cent with a median of 7.1 per cent. Seven of the teachers are included within the restricted range of five to seven per cent.

The largest proportion of lines in the evaluative category involves justification, rather than opining. This apparently reflects the fact that opinions can be stated in relatively few words, while justifications typically involve longer statements. But in view of the nature of the substantive material presented in the pamphlet, it is somewhat surprising that in the majority of classes so little of the discourse expressed evaluative meanings. A major focus of the teaching unit concerned trade policies, which inevitably involve some opinion and some justification of of one's opinion about trade policies. The results, however, show that relatively little of the classroom discussion was taken up by statements made either by teachers or by pupils expressing their personal opinions about trade policies. For the most part, instead of expressing their own opinions, teachers and pupils reported opinions of other people. In light of the rather limited amount of knowledge that most students probably had in this area, the restriction in amount of evaluative meanings contained in the discourse may be a realistic reflection of what would be appropriate for this sample of students.

Analytic Meanings

The smallest proportion of the classroom discourse in terms of lines was devoted to analytic meanings, including defining and interpreting. The teachers ranged from a low of 2.9 to a high of 10.1 per cent, with a median of 5.1 per cent. The range in this area was even more restricted than that in the categories of empirical and evaluative meanings. Ten of the teachers were clustered within a range from three to five per cent devoted to analytic meanings. The relatively low proportion of lines devoted to analytic meanings seems compatible with the non-technical presentation in the pamphlet. Other than terms such as specialization, direct investment, and various kinds of trade barriers, the pamphlet was presented in words that most students probably could understand. Therefore, having defined a few of the major technical economic terms, there was probably little need in the classroom to spend a great deal of time on analytic meanings.

Summary of Substantive-Logical Meanings

The data indicate that among the 15 classes, the median percentage of lines devoted to fact stating and explaining was approximately 60 per cent; about seven per cent was devoted to stating opinions and justifications; and only five per cent was devoted to defining and interpreting. These results, however, cannot be generalized to classes in other subject matter areas, for it is likely that the substantive-logical meanings expressed in a class discussion are to a large extent a function of the particular subject matter under study.

Substantive and Substantive-Logical Meanings

The cross tabulation of substantive and substantive-logical meanings provides essentially the same picture of the classroom discourse as the separate analyses of the substantive and substantive-logical categories. For all classes the largest percentage of lines was devoted to explanation of general trade topics (TRA/XPL), which accounted for 12.3 per cent of the lines in all 15 classes. All other cross tabulations involved less than eight per cent of the total lines. In general, statements of personal opinion (OPN) were evenly distributed over most of the substantive categories, although justification of opinions (JUS) was highest when the substantive meanings of the discussion concerned free trade and the reduction of trade barriers. This finding is consistent with expectations based on the nature of the unit of instruction, for it is precisely in the area of reduction of trade barriers that pro and con arguments are most appropriate.

INSTRUCTIONAL MEANINGS

As indicated in Table 20, the median percentage of lines concerned with instructional meanings was 26 per cent, with a range from 11.6 to 36.4 per cent. The greater proportion of lines involving instructional meanings is spoken by teachers. Occasionally, pupils ask about assignments, examinations, or class procedures, but for the most part the instructional meanings are expressed by teachers rather than pupils.

The largest proportion of these lines involved the categories of STA (referring to statements previously made in the discourse) and ACV (referring to vocal actions). The high proportion of statements within the categories of instructional meanings accounted for by those coded STA indicates that a large proportion of the instructional meanings spoken by the teacher involved reactions to pupils' statements. One might consider these meanings as metacommunications, in that they are communications about previous communications. This reflects one of the teacher's major responsibilities, which is to comment upon the discourse in the classroom. In contrast, pupils rarely make such comments.

Statements coded ACV were primarily concerned with teachers' soliciting pupils to talk. In a sense, the large proportion of lines indicated for ACV is an overrepresentation of the amount of actual class time devoted to this category, for a teacher's statement simply calling the name of a student to give him permission to speak was coded ACV and given one line of credit. This means that the one line value often was coded for the teacher's saying a single word.

Other than the two categories concerned with the teacher's

TABLE 20

PERCENTAGE OF LINES AND MOVES IN EACH INSTRUCTIONAL CATEGORY FOR EACH OF THE FIFTEEN CLASSES, FOR ALL CLASSES AND FOR ALL CATEGORIES COMBINED

Class		PRC	MAT	STA	ASG	PER	LOG	ACT	ACV	ACP	ACC	ACE	LAM	Total
1	Moves	1.7	3.7	22.9	0.1	0.3	0.1	0.9	9.3	0.9	3.8	0.2	0.2	44.1
	Lines	2.3	3.7	11.7	1.2	0.2	0.1	0.6	4.7	.4	2.2	0.1	0.1	27.3
2	Moves	6.3	4.7	20.0	1.3	0.1	0.1	0.5	11.5	1.4	2.7	0.1	0.4	49.1
	Lines	5.1	2.7	19.4	2.1	0.1	0.04	0.3	4.5	0.6	1.0	0.04	0.1	35.9
3	Moves	8.7	9.6	14.9	4.0	2.7	0	1.9	8.8	2.4	4.4	0.03	0.3	57.7
	Lines	8.1	3.9	6.5	8.2	1.2	0	1.2	3.5	1.3	2.3	0.1	0.1	36.4
4	Moves	5.2	3.3	23.1	2.6	1.1	0.3	0.3	11.0	1.4	2.8	0.5	0.4	52.0
	Lines	4.5	1.8	10.3	4.4	0.5	0.1	0.1	4.9	0.8	1.3	0.2	0.2	29.1
5	Moves	6.7	3.2	24.4	1.0	0.7	0.2	0.4	13.8	1.6	5.0	0	0	52.5
	Lines	7.5	2.6	10.0	1.6	0.2	0.5	0.2	5.5	0.9	2.3	0	0	31.3
6	Moves	4.8	2.3	19.7	1.2	1.2	1.2	0	8.7	0.3	2.2	0	0	41.6
	Lines	7.8	0.5	6.8	2.4	0.3	0.04	0	2.8	0.1	0.6	0	0	21.3
7	Moves	6.3	7.3	22.9	1.0	0	0.2	0	9.6	0.5	1.4	0.1	0.2	49.5
	Lines	6.3	3.0	10.1	1.2	0	0.2	0	4.3	0.2	0.7	0.1	0.1	26.2
8	Moves	2.5	2.2	24.9	0.4	0.5	0.1	0.4	9.4	0.5	3.5	0	0	44.4
	Lines	3.2	1.8	10.2	0.9	0.3	0.1	0.2	3.6	0.3	1.5	0	0	22.1
9	Moves	5.8	0.9	21.7	0.9	0.4	0	0	4.8	0.9	1.1	0	0	36.5
	Lines	4.7	0.5	4.0	0.9	0.1	0	0	0.9	0.2	0.3	0	0	11.6
10	Moves	4.4	2.4	22.2	0.6	0.6	0.3	0	6.1	0.1	2.5	0	0	39.2
	Lines	4.7	1.2	7.0	1.0	0.2	0.3	0	1.6	0.03	0.7	0	0	16.7
11	Moves	4.4	6.0	18.6	0.6	0	0	0.1	4.9	0.5	9.7	0.1	0	44.9
	Lines	5.9	3.6	6.5	1.3	0	0	0.1	1.8	0.2	3.8	0.1	0	23.3
12	Moves	2.6	3.0	19.1	2.2	0.6	0	0.1	10.6	0.4	4.0	0.1	0.4	39.5
	Lines	2.2	1.4	8.1	1.0	0.3	0	0.04	4.4	0.2	1.7	0.1	0.2	19.6
13	Moves	2.0	0.9	21.7	1.2	0.3	0	0.1	12.3	2.7	2.3	0	0.1	43.6
	Lines	1.7	0.7	12.4	3.0	0.2	0	0.03	6.9	2.2	1.4	0	0.1	28.6
14	Moves	4.3	6.1	24.5	3.1	0.2	0.5	0.1	8.3	0.5	2.0	0.1	0.1	49.8
	Lines	5.7	4.0	9.1	7.0	0.1	0.3	0.03	2.8	0.3	0.8	0.03	0.03	30.1
15	Moves	5.0	2.3	23.3	2.0	0.1	0	1.0	9.5	1.5	3.5	0.5	0.3	49.0
	Lines	6.6	1.0	11.8	2.2	0.1	0	0.6	4.6	1.1	1.6	0.2	0.1	29.9
$\overline{X}$	Moves	4.3	3.6	21.9	1.4	0.5	0.1	0.4	9.7	1.9	3.4	0.1	0.2	46.9
	Lines	5.0	2.1	9.7	2.5	0.2	0.1	0.2	3.8	0.6	1.5	0.1	0.1	26.0

metacommunications coded in the STA designation and the teacher's solicitations directing the pupils to speak coded under ACV, the great majority of lines in the instructional category was concerned with procedure (PRC), material (MAT, and assignments (ASG). Very little of the instructional content in the classroom discourse involved any of the other categories included in the system of analysis. There was, for example, rarely any discussion of the logic of the material (LOG), and rarely any discussion of language mechanics (LAM). The view that logic and the use of language are taught in every class is certainly not supported by the data.

Considering only the three categories of procedures, material, and assignments, relatively little of the classroom discourse was focused on these matters. The classes ranged from a low of 4.6 per cent of the lines devoted to these categories to a high of 20.2 per cent, with a median of 9.9 per cent. This range, however, does not adequately represent the data, for the distribution of teachers was largely skewed toward the lower end of the distribution; that is, 13 of the 15 teachers had between 4.6 and 12 per cent of the lines devoted to these instructional categories. Of the other two teachers, one had 16.7 per cent of the lines in these areas and the other had 20.2 per cent.

The system for coding instructional content included a large variety of possible categories. These covered remarks about persons (PER), logic (LOG), physical actions (ACP), cognitive behaviors (ACC), emotional behaviors (ACE), and language mechanics (LAM). None of these categories accounted for more than one half of one per cent of the classroom discourse in any of the classes. It would seem, therefore, that while instruction techniques unquestionably play an important part in classroom interaction, instructional meanings per se are infrequently the direct focus of discussion.

INSTRUCTIONAL-LOGICAL MEANINGS

As one would anticipate from the analysis of instructional meanings, the instructional-logical meanings are expressed primarily by teachers rather than the pupils. Of the various categories considered in the instructional-logical category (Table 21), fact stating (FAC) accounted for the largest percentage of lines (8.6 per cent for all 15 classes). The next most frequent category in the instructional-logical category was perform (PRF), which accounted for 5.1 per cent. This reflects the teachers' relatively frequent directive statements concerned with instructional content, such as directing a pupil to speak or to perform some other classroom action. Other than the evaluative subcategories in the instructional-logical meanings, none of the other categories accounted for more than one or two per cent of the classroom discourse.

Evaluative Reactions

Evaluative reactions clearly are part of the teacher's role and not part of the pupil's role in the classroom. This is supported by the fact that for pupils none of the categories of evaluative reactions accounted for more than one per cent of the lines in any classroom, and for most evaluative categories pupils' statements accounted for less than one per cent of the lines. Thus, pupils do not react evaluatively either to the teacher or to other pupils.

TABLE 21

PERCENTAGE OF LINES AND MOVES IN EACH INSTRUCTIONAL-LOGICAL CATEGORY FOR EACH OF THE FIFTEEN CLASSES, FOR ALL CLASSES AND FOR ALL CATEGORIES COMBINED

Class		FAC	XPL	DEF	OPN	JUS	INT	NCL	PRF	QAL
1	Moves	9.5	0.5	0	0.4	0.1	0.8	0	4.4	1.6
	Lines	7.3	0.3	0	0.8	0.1	0.5	0	4.9	0.8
2	Moves	13.3	0.4	0	2.1	0.1	1.5	0	7.9	2.5
	Lines	9.7	0.2	0	1.6	0.1	0.8	0	4.0	1.0
3	Moves	24.8	1.2	0	1.2	1.0	2.4	0	9.8	1.0
	Lines	13.8	2.2	0	0.8	1.6	1.8	0	10.9	0.3
4	Moves	12.4	0.5	0	1.3	0.4	1.9	0	10.6	2.0
	Lines	8.6	0.4	0	0.8	0.4	1.2	0	7.4	1.0
5	Moves	18.1	0.1	0	0.4	0	0.4	0	12.0	4.4
	Lines	13.8	0.1	0	0.6	0	0.2	0	6.3	1.8
6	Moves	11.2	0.7	0	0.8	0	2.0	0	5.8	2.2
	Lines	8.5	1.3	0	0.8	0	0.7	0	3.6	1.1
7	Moves	11.0	1.4	0	0.3	0.1	2.8	0	6.9	2.3
	Lines	9.0	1.7	0	0.1	0.1	1.6	0	3.5	1.0
8	Moves	8.9	0.3	0	0.5	0.3	2.8	0	6.6	5.1
	Lines	5.9	0.7	0	0.4	0.2	1.4	0	3.7	2.2
9	Moves	8.4	0	0	0.7	0.2	0	0	3.7	1.7
	Lines	5.4	0	0	0.2	0.4	0	0	1.2	0.3
10	Moves	8.6	0.6	0	1.0	0.1	2.4	0	4.5	4.9
	Lines	6.1	1.0	0	0.6	0.03	0.8	0	1.6	1.8
11	Moves	16.5	0	0	0.4	0	0.8	0	3.9	1.8
	Lines	13.2	0	0	0.1	0	0.7	0	2.7	0.7
12	Moves	11.7	0	0	1.1	0.1	1.1	0	6.2	3.0
	Lines	6.5	0	0	0.5	0.2	0.5	0	2.9	1.2
13	Moves	6.7	0.4	0	0.7	0	1.1	0	7.5	2.4
	Lines	4.6	0.3	0	0.5	0	0.7	0	7.6	1.4
14	Moves	11.9	0	0	0.5	0.1	1.1	0	8.7	4.2
	Lines	9.6	0	0	0.4	0.1	0.6	0	10.7	1.5
15	Moves	13.5	0.4	0	0.7	0.6	2.1	0	7.1	3.7
	Lines	9.5	0.3	0	0.4	2.2	1.5	0	4.5	1.7
$\bar{X}$	Moves	12.0	0.4	0	0.8	0.2	1.5	0	7.2	2.9
	Lines	8.6	0.5	0	0.6	0.4	0.9	0	5.1	1.2

TABLE 21 (continued)

Class		RPT	ADM	POS	NEG	NAD	PON	AON	DIR	Total
1	Moves	12.6	4.5	5.5	1.4	0.6	0.3	0.1	0	42.3
	Lines	6.2	2.2	2.9	0.7	0.3	0.2	0.03	0	27.2
2	Moves	5.1	8.2	3.9	0.7	0.5	0.4	0	0.1	46.7
	Lines	2.2	3.3	12.6	0.3	0.2	0.1	0	0.04	36.1
3	Moves	6.1	1.9	3.4	0.3	0.4	0.8	0.1	0.1	54.5
	Lines	2.3	0.6	1.4	0.1	0.1	0.2	0.04	0.04	36.2
4	Moves	4.5	7.9	7.0	0.8	1.1	0.4	0.3	0	51.1
	Lines	1.8	3.1	3.3	0.4	0.6	0.2	0.2	0	29.4
5	Moves	1.4	6.6	8.5	1.8	0.9	0.8	0.5	0.2	56.1
	Lines	0.6	2.4	3.5	0.7	0.3	0.4	0.4	0.1	31.2
6	Moves	9.3	3.8	1.3	1.0	1.3	0.3	0	0	39.7
	Lines	3.0	1.1	0.3	0.3	0.7	0.1	0	0	21.5
7	Moves	8.6	4.8	5.5	1.4	0.7	0	0	0	45.8
	Lines	3.8	2.0	2.4	0.6	0.3	0	0	0	26.1
8	Moves	4.6	5.7	5.9	1.2	0.9	0.5	0	0.1	43.4
	Lines	1.8	2.2	2.3	0.4	0.6	0.2	0	0.1	22.1
9	Moves	2.6	11.7	5.8	0.7	0.7	0.2	0	0	36.4
	Lines	0.6	2.1	1.1	0.1	0.2	0.04	0	0	11.6
10	Moves	5.6	3.4	4.7	1.4	1.6	0	0	0	38.8
	Lines	1.4	1.0	1.3	0.4	0.7	0	0	0	16.7
11	Moves	9.9	2.5	4.5	0.5	0.4	0.4	0	0	41.6
	Lines	3.2	0.9	1.4	0.1	0.1	0.1	0	0	23.2
12	Moves	7.8	2.2	5.8	0.6	1.8	0.3	0	0	41.7
	Lines	3.2	0.9	2.6	0.3	0.7	0.1	0	0	19.6
13	Moves	12.6	4.2	5.5	1.0	0.8	0.2	0	0	43.1
	Lines	7.0	2.3	3.1	0.5	0.5	0.1	0	0	28.6
14	Moves	4.5	8.5	4.8	1.4	0.6	0.2	0	0	46.5
	Lines	1.8	2.6	1.7	0.7	0.2	0.1	0	0	30.0
15	Moves	5.5	5.3	7.2	0.4	1.2	0.3	0.1	0	48.1
	Lines	2.5	2.3	3.7	0.2	0.8	0.2	0.1	0	29.9
$\overline{X}$	Moves	7.3	5.2	5.5	1.0	0.9	0.3	0.1	0.03	45.3
	Lines	2.9	2.0	2.9	0.4	0.4	0.1	0.04	0.02	26.0

Negative Reactions. Among the teachers, negatively oriented evaluations (Table 22) clearly play much less of a part than positively oriented evaluations. The distinct negative reactions such as "no" and "not right", coded in the category NEG, accounted for less than one per cent of the lines in all classrooms. The negatively oriented reactions coded under NAD (not admitting) also accounted for less than one per cent of the lines. Thus, the definite negative reinforcements made by the teachers were relatively rare in our sample of classroom discourse. Somewhat less direct negative reinforcement is represented by the qualifying category of reaction (QAL), but even this category accounted for relatively little of the discourse. Eight of the 15 teachers had less than one per cent of the lines in this category. The severely restricted range is indicated by a low of 0.3 and a high of only 1.8 per cent, with a median of one per cent in the qualifying category.

Positive Reactions. Statements in the positive category (POS) did not account for a very large proportion of the lines. This portion was greater, however, than that contained in any of the negative reinforcing categories. The teachers ranged from 0.3 to 12.4 per cent of the lines in this category, with a median of 2.1 per cent. This distribution, however, was distinctly skewed toward the lower end, with 14 of the 15 teachers having less than four per cent of their lines devoted to directly positive reactions. Therefore, while teachers offered almost no negative reactions, they also made relatively few clear cut positive reactions.

Admitting reactions (ADM), which represent a degree of positive

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TABLE 22

PERCENTAGE OF LINES AND MOVES IN EACH CATEGORY OF EVALUATIVE REACTION AND RATIO OF POSITIVE TO NEGATIVE EVALUATIONS FOR EACH OF THE FIFTEEN TEACHERS AND FOR ALL TEACHERS COMBINED

Teacher		POSITIVE				NEGATIVE				Ratio Positive: Negative
		POS	ADM	RPT	Total	QAL	NAD	NEG	Total	
1	Moves	5.4	4.5	7.9	17.8	1.5	0.6	1.4	4.5	4 : 1
	Lines	2.8	2.2	3.9	8.9	0.8	0.3	0.6	1.7	5.2: 1
2	Moves	3.5	7.9	1.9	13.3	2.0	0.4	0.4	2.8	4.8: 1
	Lines	12.4	3.2	0.7	16.3	0.9	0.1	0.1	1.1	14.8: 1
3	Moves	2.9	1.5	5.0	9.4	0.9	0	0.01	0.9	10.4: 1
	Lines	1.2	0.5	1.9	3.6	0.3	0	0.04	0.3	12 : 1
4	Moves	6.1	7.8	2.4	16.3	1.5	0.7	0.6	2.8	5.8: 1
	Lines	2.9	3.1	1.0	7.0	0.8	0.4	0.3	1.5	4.7: 1
5	Moves	7.7	6.6	0.8	15.1	2.5	0.5	0.6	3.6	4.2: 1
	Lines	3.3	2.4	0.3	6.0	1.1	0.2	0.2	1.5	4 : 1
6	Moves	1.2	3.5	6.7	11.4	2.2	1.2	0.8	4.4	2.6: 1
	Lines	0.3	1.0	2.0	3.3	1.1	0.7	0.2	2.0	1.7: 1
7	Moves	4.9	4.5	6.3	15.7	1.8	0.4	1.3	3.5	4.5: 1
	Lines	2.1	2.0	2.8	6.9	0.9	0.2	0.5	1.6	4.3: 1
8	Moves	5.4	5.5	2.8	13.7	4.0	0.8	0.8	5.6	2.4: 1
	Lines	2.1	2.1	1.1	5.3	1.8	0.6	0.3	2.7	2 : 1
9	Moves	5.6	11.5	1.5	18.6	1.7	0.4	0.7	2.8	6.6: 1
	Lines	1.0	2.0	0.4	3.4	0.3	0.1	0.1	0.5	6.8: 1
10	Moves	4.7	3.2	3.6	11.5	4.5	1.5	1.4	7.4	1.6: 1
	Lines	1.3	1.0	0.9	3.2	1.7	0.7	0.4	2.8	1.1: 1
11	Moves	4.0	2.5	7.8	14.3	1.8	0.2	0.4	2.4	6 : 1
	Lines	1.2	0.9	2.5	4.6	0.7	0.1	0.1	0.9	5.1: 1
12	Moves	5.1	2.0	3.9	11.0	1.9	1.2	0.3	3.4	3.2: 1
	Lines	2.4	0.8	1.6	4.8	0.7	0.5	0.1	1.3	3.7: 1
13	Moves	5.3	4.2	4.3	13.8	2.3	0.7	0.8	3.8	3.6: 1
	Lines	3.0	2.3	3.1	8.4	1.3	0.5	0.4	2.2	3.8: 1
14	Moves	4.5	8.5	3.3	16.3	4.2	0.6	1.2	6.0	2.7: 1
	Lines	1.7	2.7	1.1	5.5	1.5	0.2	0.7	2.4	2.3: 1
15	Moves	6.4	5.2	3.5	15.1	2.7	0.9	0.2	3.8	4 : 1
	Lines	3.4	2.2	1.5	7.1	1.2	0.6	0.1	1.9	3.7: 1
$\bar{X}$	Moves	5.1	5.1	4.4	14.6	2.4	0.7	0.7	3.8	3.8: 1
	Lines	2.8	1.9	1.7	6.4	1.0	0.3	0.3	1.6	4 : 1

reinforcement somewhat less explicit than those coded in the POS category, accounted for less than four per cent of the lines in each of the classes. They ranged from 0.5 to 3.2 per cent, with a median of two per cent in the admitting category. A similar pattern was found for the repeat category of evaluative reactions (RPT), with a low of 0.3 and a high of 3.9, with a median of 1.5 per cent. As in the admitting category, all 15 teachers had less than four per cent of the total lines in this category of reactions.

If all of the positively oriented reactive categories are considered together, POS, ADM, and RPT, obviously a somewhat larger proportion of lines is included in these reactive categories. In terms of the total amount of classroom discourse, however, these reactive categories play a relatively minor quantitative role, with a low of 3.2 per cent to a high of 16.3 and a median of only 5.5 per cent. The high of 16.3 per cent represents a most unusual class in terms of the distribution of teachers in our sample; 12 of the 15 teachers were within the range of three to seven per cent of the lines in the positively oriented reactive categories, with only three teachers (1, 2, and 13) above seven per cent. This does not necessarily imply that positive reactions play an insignificant role in the learning process, but it does mean that quantitatively little of the discourse is directly concerned with this kind of reaction.

Further evidence of the predominance of positively toned evaluative reactions is provided by a ratio of positive, admitting, and repeating reactions to negative, not admitting, and qualifying reactions. This ratio compares the positive evaluative reactions with the negative reactions. For this sample of teachers, the ratio runs from 1.1 to 1 to 14.8 to 1 with a median of 4.0 to 1. Thus, the 15 teachers tended to be about ten times more positive, in terms of percentage of lines, than negative in their reactions to pupils' statements.

TEST RESULTS

The attitude scale and the test of economic knowledge described in Chapter Two were administered both before and after the experimental class sessions to all students who participated in the research. Before considering the various investigations of possible correlates of learning as measured by pre-post test differences, the matrix of intercorrelations obtained for the test results will be discussed briefly. Although these data were not the direct focus of the research, they provide some information about attitude change, the amount of learning that occurred, and the relationship of social class and verbal intelligence to test performance (Table 23).

Attitude Scale

The pre-attitude scores were fairly homogeneous for the total group of students. The mean for the total group was 3.8 with a standard deviation of .59. Test item number 4, which is closest to this mean rating of the total group, reads, "Studying economics is interesting. It is a useful subject that serves the needs of many students." This item can probably be characterized as reflecting a mildly positive attitude toward studying economics. The mean post-attitude score for the total group showed almost no change. This score was 3.7 with a standard

TABLE 23

PRE-POST ATTITUDE SCALE SCORES, PRE-POST KNOWLEDGE TEST SCORES, AND PRE-POST SCORE DIFFERENCES FOR EACH OF THE FIFTEEN CLASSES AND FOR ALL CLASSES COMBINED

Class	Attitude Scale			Knowledge Test		
	Pre	Post	Pre-Post Difference	Pre	Post	Pre-Post Difference
1	3.9	3.4	+ 0.5	9.0	22.6	13.6
2	3.7	3.1	+ 0.6	16.4	29.5	13.1
3	4.2	4.5	- 0.3	12.7	23.7	11.0
4	2.9	2.7	+ 0.2	14.2	25.2	11.0
5	3.8	3.6	+ 0.2	14.6	25.5	10.9
6	4.7	4.4	+ 0.3	11.8	22.6	10.8
7	3.8	3.2	+ 0.6	9.7	20.2	10.5
8	2.7	2.8	- 0.1	15.4	25.6	10.2
9	3.6	2.9	+ 0.7	14.2	23.8	9.6
10	2.7	2.6	+ 0.1	14.9	24.3	9.4
11	3.5	3.6	- 0.1	10.8	18.9	8.1
12	4.0	5.5	- 1.5	17.8	24.8	7.0
13	3.7	3.2	+ 0.5	11.0	17.7	6.7
14	4.8	5.2	- 0.4	11.9	17.5	5.6
15	4.1	3.6	+ 0.5	11.4	12.7	1.3
$\bar{X}$	3.8	3.7	+ .08	13.1	22.4	9.1
Standard Deviation	.59	.86	.55	2.3	3.8	2.8

deviation of .86. Thus, as a total group the students showed almost no change in attitude as a result of the experimental teaching unit. Considered separately, however, there was a modest range of differences in amount of change among the 15 classes, ranging from the greatest positive change of +.7 for Class 9 to the greatest negative change of -1.5 for Class 12. On the post-test, the most positive average class rating was 2.6 (Class 10), which is about halfway between a strong and a moderately positive attitude toward studying economics. This class, however, showed almost no change, having started with a pre-test rating of 2.7. The most negative rating was 5.5 obtained for Class 12, which represents a very mildly positive attitude and also reflects a considerable shift in the negative direction for this class.

Test of Economic Knowledge

On the test of economic knowledge there was a wide range of scores on the pre-test from a low of 9.0 for Class 1 to a high of 17.8 for Class 12, with a mean of 13.1 and a standard deviation of 2.3. This indicates that the various classes started the unit with quite different amounts of knowledge of the subject matter. It is interesting to note that Class 12 started the experimental unit with the highest vocabulary scores, the greatest amount of knowledge about the economic subject matter, and one of the most negative attitudes about studying economics. On the post-test students in this class also ended up with relatively little learning and clearly the most negative attitude.

For all classes, post-test scores were nearly double those for the pre-test. The post-test mean was 22.4 with a standard deviation of 3.8.

The average increase from pre- to post-testing was 9.1 points. Thus, there is clear-cut evidence that considerable learning took place during the period of the experiment. An interesting incidental finding is that the classes were more variable at the end of the unit than at the beginning; that is, in every case, the standard deviation of scores in a class increased from pre- to post-testing. Of course, mean scores also increased, and the standard deviation is in part a function of the magnitude mean test scores. Nevertheless, the data demonstrate that instruction increased, rather than decreased, individual differences among the students. Assuming that the difference between pre- and post-test scores measures learning, the results show considerable differences among classes in amount of learning. The differences in the scores range from a high of 13.6 for Class 1 to a low of 1.3 for Class 15.

The matrix of intercorrelations indicates that the test is internally consistent; if a student did well on one part, he tended to do well on the other two parts. On the pre-test, for example, the correlation between section one and section two was .68; between sections one and three, .62. The correlation between sections two and three was particularly high, .79. For each section, the post-test correlations were somewhat smaller, but consistently positive. This means that if a student knew the principles of the unit, he could apply these principles to concrete problems.

A correlation of .66 was found between the pre-test and post-test results. Thus the students who did well on the pre-test tended to do well on the post-test.

Verbal intelligence, as measured by the vocabulary test, is related to pre-test performance (correlation .60); there is a low and statistically insignificant correlation between verbal intelligence and post-test performance (correlation .38); and verbal intelligence is independent of learning as estimated by pre-post difference scores (correlation .02). While verbal ability, therefore, is related to the knowledge a student begins with, it plays less of a role in determining where he ends up, and seems to play no significant role in determining the amount of learning within the period investigated.

There was also no significant relationship between ratings on the attitude scale and test scores in economic knowledge. The correlation between pre-attitudes and change in economic knowledge test scores was .24; between post-attitude and change in test scores, .31 and between pre-post attitude differences and change, .23. These findings may be a function of several factors. First, while few students were strongly interested in studying economics, there was probably a sufficient moderately positive attitude among the students to motivate performance. Most students started with the attitude that studying economics is interesting and useful. In addition, the fact that the students were participating in an experiment probably influenced performance more than did initial attitudes. Finally, there was a relatively small range of differences in attitude, and certainly an extremely small range of change in attitude; both factors, of course, would tend to reduce the magnitude of the correlations that could possibly be obtained.

Socio-Economic Class Rating

Socio-economic class level, as estimated on the basis of parental occupation, is positively related to scores on the knowledge test. The correlation with the pre-test is .76; between class level and post-test performance the correlation is .35. Class level, however, is independent of difference in knowledge test scores, correlation .03. Thus, students from high class levels knew more about economics to begin with, and this relationship was attenuated somewhat by instruction. Perhaps the most striking correlation is the one between class level and vocabulary scores, correlation .74. A correlation of about 0.3 has been found in other studies relating class level and general intelligence; in this sample that relationship is considerably higher. Thus, the students from families of high socio-economic class level tended to have high verbal intelligence and to know more about economics before beginning the unit.

TEST RESULTS AND CLASSROOM DISCOURSE

The objectives of this research were to describe the verbal events that occurred in each class, to discover similarities and consistencies in the pedagogical patterns of discourse, to define the distinctive aspects of the roles played by teachers and pupils, and to provide some estimate of the variability among teachers and classes along each of the dimensions of discourse investigated. The results presented thus far have been in terms of these aims, and it seems reasonable to conclude that a consistent and remarkably stable pattern of pedagogical discourse has emerged from the data.

Although the present research focuses on description of teaching in order to isolate and define specific variables in the language of the classroom, subsequent research should consider the consequences of these variables. Among the most important of these consequences are changes in pupils' knowledge and abilities related to the subject matter and changes in pupils' attitudes towards studying a particular substantive topic. In view of the beginning stage of the present study and the limits of formal, rigorously grounded knowledge currently available, emphasis on evaluation of outcomes seems unwarranted at the present time. The study of relationships between classroom variables and measures of learning becomes appropriate once the complex events of the classroom have been systematically and reliably described.

Nevertheless, preliminary investigations of the relationships between classroom variables and outcome measures may serve as a useful guide in developing subsequent research, in that meaningful descriptions of pedagogical events must eventually be related to pupil learning and attitude change. These are obviously the outcomes of teaching from which descriptive studies ultimately gain one of their chief values. The following discussion of learning and attitude change, therefore, is presented principally as an empirical basis for guiding further research by raising relevant questions. In the following discussion, no effort will be made to present the results of these preliminary investigations in statistical terms which are likely to misrepresent the purpose of this study. The results will be discussed rather in terms of inspection of the data with the aim of posing problems for subsequent investigation.

The initial concerns of the present research with relating classroom discourse to learning and attitude change involved two kinds of meanings: (1) substantive meanings; and (2) emotional meanings. Although these interests were exploratory, there seemed to be at least some basis for anticipating that meanings expressed in the classroom would be related to measurable outcomes.

Substantive Meanings and Learning

It seemed likely that, other things being equal, pupils would learn more about the specific topics discussed in the classroom than about the related topics not discussed in the classroom. In like manner, it was reasonable to propose that the amount of learning would be related to the amount of time devoted to a specific topic. To investigate this possibility, the substantive areas discussed most frequently and the ones discussed least frequently by each class were identified. Then, for each class the post-pre test scores for the items relevant to the most and least frequently discussed topics were computed. Assuming that the post-pre test score differences provided an estimate of learning for each of the relevant substantive topics, it was anticipated that the post-pre differences for the items related to the most frequently discussed substantive topics would be greater than the differences for the items related to the least discussed topics. The results of this analysis, summarized in Table 24, indicate that the initial expectation was not substantiated. Seven of the classes showed a greater difference for the most discussed topics, and eight classes showed a greater difference in the opposite direction.

TABLE 24

COMPARISON OF PRE-POST TEST SCORE DIFFERENCES FOR QUESTIONS RELATED TO EACH CLASS' MOST FREQUENTLY DISCUSSED AND LEAST FREQUENTLY DISCUSSED AREAS OF SUBSTANTIVE MEANING

Class	Most Frequently Discussed Topic Post-Pre Difference	Least Frequently Discussed Topic Post-Pre Difference	Most Minus Least
1	+ 0.70	+ 0.20	+ 0.50
2	+ 0.60	+ 0.49	+ 0.11
3	+ 0.10	+ 0.53	- 0.43
4	+ 0.60	+ 0.40	+ 0.20
5	+ 0.03	+ 0.20	- 0.17
6	+ 0.45	+ 0.55	- 0.10
7	+ 0.13	+ 0.73	- 0.60
8	+ 0.00	+ 0.60	- 0.60
9	+ 0.60	+ 0.20	+ 0.40
10	+ 0.10	+ 0.80	- 0.70
11	+ 0.07	+ 0.12	- 0.05
12	+ 0.23	+ 0.12	+ 0.11
13	+ 0.27	+ 0.00	+ 0.27
14	- 0.02	+ 0.40	- 0.42
15	- 0.10	+ 0.02	- 0.12
$\bar{X}$	+ 0.30	+ 0.40	- 0.10

When these results are considered in conjunction with the results reported for the analysis of substantive meanings contained in the classroom discourse, a possibly significant implication becomes apparent. Of all the categories of analysis, classes showed the greatest variability in their patterns of discourse concerned with substantive meanings. Although for the most part the discussion remained within the general area of international trade, each teacher emphasized a unique pattern of substantive meanings within these bounds. Some emphasized ways of decreasing trade barriers; others focused primarily on reasons for trade; still others concentrated on details related to such topics as imports and exports or foreign investment.

Thus, the overall substantive pattern of the discussion differed from class to class. This suggests that within each of the major substantive topics, such as specialization and foreign investment, the specific topics of discussion also differed from class to class -- an assumption supported by observations made during the course of the content analysis. The discourse in two classrooms, for example, might have dealt with the general topic of foreign investment, and therefore coded FOR, but the discussions could very well have been on quite different aspects of the complex topic of foreign investment.

This observation leads to a consideration of the test used in this research to measure "learning." The test sampled specific items which could be covered in any topic, and it was assumed that the test items represented a judicious choice of subject matter to be learned. It may be, however, that the selection of items was in a significant sense arbitrary, reflecting the research staff's opinions in the same way that the unique patterns of substantive discourse in the various classes reflected the opinions of the various teachers. Thus, it is not unlikely that a large part of the variance in our measure of learning was the degree to which each teacher's choice of subject matter to be learned was congruent with the items on the test.

This does not imply that general tests of learning are invalid. For certain purposes, it is clearly appropriate for experts to decide on the knowledge and skills required for a given task. The College Entrance Examination Board and the Graduate Record Examination, for example, represent useful testing devices for particular purposes. But for research aimed at discovering the relationships between what goes on in a classroom and subsequent learning outcomes, the test model which begins with a more or less arbitrary judgment about what should be learned seems inappropriate for the task of discovering the outcomes of classroom activity.

Rather than formulate measures of learning on the basis of an evaluative model of testing, which was done in the present study, it seems appropriate to develop a more meaningful approach to this problem, beginning at the descriptive level. The present investigation was aimed at describing classroom discourse, and the methods paralleled a natural history approach to observational techniques. At the outset of the study, however, learning was viewed as something "outside" the classroom situation which was to be described. Outcomes of classroom discourse are, nevertheless, an intrinsic part of the total pedagogical situation, and as such, should be investigated initially from a descriptive point of view. In other words, instead of setting up certain bits of knowledge as those which should be learned, and then relating the descriptive variables of discourse to the criterion of what should be learned, it would undoubtedly be more useful to formulate future research in terms of the question, "What kinds of classroom events are related to what kinds of learning outcomes?" Once again it must be emphasized that this position does not suggest that specific standards of learning outcomes are invalid or inappropriate for educational purposes. It does suggest that the evaluative test model is inappropriate at this stage of research, and that a descriptive investigation of outcome variables is as significant as descriptive investigation of classroom discourse itself.

Emotional Meanings and Learning

At the outset, this research was concerned not only with relating substantive meanings to the measure of learning, but also with investigating possible relations between emotional meanings expressed in the classroom and subsequent learning. The method of analyzing emotional meanings was described in Chapter Three. Each teacher was described in terms of three dimensions of emotional meaning: (1) valence; (2) activity; and (3) strength. The preliminary findings indicated that teachers were relatively stable over class sessions in terms of ratings of these three dimensions, so that it seemed reasonable to assume that the overall rating of each teacher along each dimension of meaning validly defined a teacher's emotional style. Because of the confidential nature of the tape recordings, ratings were obtained only for those teachers who consented to have recordings of their classes played for persons other than regular members of the research staff.[*] Thirteen teachers were rated and ratings for their classes are summarized in Tables 25, 26, and 27, where teachers are listed in order of amount of learning.

Valence. As shown in Table 25, there is no apparent relationship between the valence (pleasantness-unpleasantness) of the meanings expressed by the teacher and subsequent learning of the pupils. The most positively evaluated teacher in terms of pleasantness of his emotional expressions also obtained the least amount of learning. The results, however, do not support a consistently negative relationship between valence and learning, for the next most positive teacher obtained the second largest amount of learning. The null results in regard to relationship between valence and learning is in part a function of the fact that the teachers were within a restricted range on the valence scale. Most teachers were perceived as mildly positive in their emotional expressions, with only one teacher (Teacher 12) described as distinctly negative. None was described as overwhelmingly positive. Perhaps this is a result of the teachers' awareness of the recording and their reluctance to express strongly negative emotional reactions. At any rate, there is no evidence in support of a hypothesis that valence is in any way related to learning.

Activity. In contrast to the valence dimension, the activity dimension of emotional meaning does seem to be positively related to learning (Table 26). The teachers who obtained the greatest amount of

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[*] We wish to express our appreciation to the administration, teachers, and pupils of Tenafly High School, Tenafly, New Jersey, for their cooperation in the analysis of emotional meanings.

TABLE 25

AVERAGE RATING ON VALENCE DIMENSION OF EMOTIONAL MEANING FOR EACH CLASS AND EACH SESSION

	Session				
Class	I	II	III	IV	$\bar{X}$
1	3.0	4.4	4.0	2.5	3.5
2	3.0	4.0	2.7	1.8	2.9
3	3.9	3.3	3.4	3.7	3.6
4	3.0	3.0	3.3	3.1	3.1
5	2.9	3.2	3.2	3.4	3.2
7	3.2	3.4	2.6	3.1	3.1
9	3.1	3.6	3.3	3.9	3.5
10	3.5	3.9	3.2	3.7	3.6
11	3.2	3.6	2.8	3.1	3.2
12	3.7	4.2	3.7	4.3	4.0
13	4.2	3.2	2.3	2.7	3.1
14	2.5	2.8	4.0	3.0	3.1
15	2.8	3.1	2.5	3.0	2.8

TABLE 26

AVERAGE RATING ON ACTIVITY DIMENSION OF EMOTIONAL MEANING FOR EACH CLASS AND EACH SESSION

			Session		
Class	I	II	III	IV	$\bar{X}$
1	3.0	3.8	3.0	2.6	3.1
2	3.6	4.7	3.6	2.5	3.6
3	3.1	3.6	3.8	3.1	3.4
4	3.3	2.8	4.3	4.2	3.6
5	3.5	2.9	3.7	3.2	3.3
7	3.4	3.2	3.8	3.3	3.4
9	3.2	3.7	2.9	3.3	3.5
10	3.8	4.1	4.3	3.6	3.9
11	3.9	4.2	4.0	3.6	3.9
12	5.1	5.8	4.7	6.1	5.6
13	6.1	4.1	2.7	3.6	4.1
14	3.5	3.0	4.2	4.6	3.8
15	3.7	4.2	3.2	3.1	3.6

learning were also rated as most active. It seems to reflect the data more adequately, however, to say that the teachers who obtained the least learning were decidedly more passive. Thus, the relationship between activity and learning seems to be primarily a function of a relationship at the lower ends of the scales of learning and the activity dimension.

Strength. The strength dimension, or potency, also seems to be related to amount of learning (Table 27). The teachers who obtained relatively more learning tend to be perceived as strong, while the teachers who obtained relatively less learning tend to be perceived as weak. The data suggest some interaction between the strength and activity dimensions in relation to learning. Two of the teachers who obtained a high amount of learning, Teachers 2 and 4, were not perceived as especially active; but they were perceived as strong teachers. Perhaps strength or activity is a necessary ingredient of effective teaching, although both need not be present in a single teacher. There may be, however, a minimum level either of strength or of activity that a teacher must have in order to be effective. Teacher 13, for example, was perceived as a relatively strong teacher, but a relatively inactive teacher. Thus, despite his "strength," Teacher 13's low activity level may very well have been related to the low level of student learning. This suggests a multi-determined view of effective teaching which would consider a variety of necessary, but not sufficient, characteristics of the effective teacher, not only for emotional meanings but also for the other categories of meaning.

TABLE 27

AVERAGE RATING ON STRENGTH DIMENSION OF EMOTIONAL MEANINGS FOR EACH CLASS AND EACH SESSION

	Session				
Class	I	II	III	IV	$\bar{X}$
1	3.7	3.1	3.2	3.5	3.4
2	2.2	3.2	3.0	2.8	2.8
3	2.2	3.0	3.1	2.3	2.7
4	3.3	3.2	2.4	2.8	3.0
5	3.4	3.0	3.3	3.4	3.3
7	3.0	2.7	3.4	2.9	3.0
9	2.8	3.1	2.9	3.3	3.0
10	3.2	3.3	2.8	3.5	3.2
11	3.3	3.0	3.8	4.0	3.5
12	3.7	4.6	3.7	3.7	3.9
13	3.7	3.5	3.3	3.0	3.4
14	3.5	4.0	4.1	4.2	4.0
15	3.0	3.5	4.3	3.8	3.7

Additional Analyses

In addition to investigating substantive and emotional meanings in relation to the measure of learning, numerous additional analyses were pursued. These analyses were concerned with the relation of a particular variable in the classroom discourse either to performance on the test of economic knowledge or to attitude change as estimated by pre-post differences obtained on the attitude scale. In general, consistently null results were obtained in these additional analyses, supporting the argument in favor of a descriptive rather than evaluative model for future research.

The amount of teacher and pupil activity, for example, was not related to performance on the test of economic knowledge or to responses on the attitude scale. Similarly, there is no consistent relationship between percentage of lines or moves in any one of the pedagogical categories and test scores or attitude scale responses. This is also the case for instructional and instructional-logical meanings, including various analyses of the data concerned with evaluative reactions. These results are consistent with expectations. One would not reasonably expect any appreciable variance in test performance or attitude scale responses to be accounted for by any single content dimension of classroom discourse. Certainly the complex cognitive activities involved in academic learning are multi-determined.

These results suggest that a next step in the study of teaching should be at the descriptive level, using the techniques developed in the present project to describe classroom discourse and expanding the descriptive focus to include the variety of outcomes that might be associated with classroom activity.

SUMMARY

1. The teacher-pupil ratio of activity in terms of lines spoken is approximately 3 to 1; in terms of moves this ratio is about 3 to 2. Therefore, regardless of the unit considered, teachers are considerably more active than pupils in amount of verbal activity.

2. The pedagogical roles of the classroom are clearly delineated for teachers and pupils. Teachers are responsible for structuring the lesson, soliciting responses from pupils, reacting to pupil's responses, and, to some extent, summarizing aspects of the discourse. The pupil's primary task is to respond to teacher's solicitations. Occasionally, pupils react to preceding statements, but these reactions are rarely evaluative. Pupils do not overtly react evaluatively to teachers' statements, and they evaluate other pupils' responses only when the teacher asks them to do so. There are deviations from this pattern, but they are infrequent. By and large, pupils do not solicit responses from the teacher about substantive meanings. When pupils do solicit, the solicitations usually concern instructional matters, such as asking for clarification of an assignment or explanation of a classroom procedure. Pupils do not spontaneously structure the discourse; their structuring moves are almost always in response to specific assignments made by the teacher, and usually involve debates or reports.

3. In most classes, structuring accounts for about 10 per cent of the lines spoken; soliciting, responding, and reacting each accounts for between 20 and 30 per cent of the lines; assigned structuring and

summarizing reactions account for a relatively small proportion of the discourse. Teachers vary somewhat from this pattern, but the distribution of variations is fairly restricted with most teachers clustering within a few percentage points of each other for any given category of analysis. Moreover, teachers tend to be remarkably stable over class sessions in their pattern of discourse, so that one can reasonably speak of a teacher's pedagogical style as an internally consistent and temporally stable dimension of behavior.

4. Analysis of the discourse in terms of teaching cycle centers on the dimensions of rate, source and pattern. Rate is described in terms of the number of teaching cycles per minute of class time; source is described in terms of the percentage of teacher-initiated cycles; and pattern is described in terms of the distribution of the 21 cycle types. These three factors may serve as the basis for developing a useful multidimensional typology of classroom discourse. Analysis in terms of these three dimensions indicates that the basic verbal interchange in the classroom is the solicitation-response. Teachers shape and frame this basic verbal unit most frequently with reacting moves, although teachers differ in the extent to which they use both structuring and reacting moves. Classes also differ in the rate at which verbal interchanges take place. The average rate is slightly less than two cycles per minute. These classes also varied in the extent to which teachers initiate teaching cycles. Generally, teachers initiate these units of verbal behavior about 85 per cent of the time.

5. Approximately 75 per cent of the discourse was specifically

concerned with substantive meanings. But of all the categories of analysis, classes varied most widely in the substantive meanings expressed. This finding was not anticipated in view of the fact that the major restriction imposed on the teachers by the research procedure was the specification of the particular substantive meanings to be covered.

6. By far the largest proportion of the discourse involved empirical meanings. This includes fact stating and explaining, which accounted for between 50 and 60 per cent of the total discourse in most of the classrooms studied. Analytic (defining and interpreting) and evaluative (opining and justifying) meanings were expressed much less frequently, each of them accounting for less than 10 per cent of the discourse in any class. Thus, most of the experimental unit was devoted to stating facts and explaining principles and problems of international trade, while considerably less of the discourse was concerned either with defining terms or with expressing and justifying personal opinions about economic issues.

7. Approximately 25 per cent of the discourse involved instructional meanings, and almost all of these were expressed by teachers rather than pupils. A large part of these meanings might be viewed as "metacommunication," in that they involved teacher's comments about pupil's preceding comments. Other instructional categories which occurred with relative frequency concerned statements about procedures, materials, and assignments. All other instructional categories accounted for very little of the discourse.

8. Paralleling the instructional category, the analysis of instructional-logical meanings indicated that the most frequent statement

in this area involved teachers stating facts, usually about procedures, assignments, and other instructional matters. A substantial proportion of statements in this area also dealt with teachers directing pupils to perform various actions; and almost all of the remaining instructional-logical entries involved some form of evaluative reaction by the teacher.

9. Teachers in this sample rarely expressed clear-cut negative reactions to pupils' responses. In general, evaluative reactions did not account for a large part of the discourse in terms of percentage of total lines spoken, but whenever teachers did evaluate, their reactions were almost always at least moderatively positive. If the teacher reacted negatively, it was usually in terms which, in one way or another, qualified the pupil's response rather than totally rejected it. In every instance, however, the ratio of positive to negative evaluations was strongly weighted in the positive direction.

CHAPTER FIVE

DISCUSSION

Perhaps the most striking aspects of the results are the remarkable similarity among many of the teachers and classrooms studied and the stability of single classes over the four sessions. The teacher and pupils, in any class, do much the same thing as the teacher and pupils in any other classroom. There are, of course, individual differences in the pattern of pedagogical discourse, and it is difficult to know how far one can generalize the present results. Presumably, classes in a so-called "activity" setting would show quite different results. Perhaps classes at other levels of education - at the primary grades or at the college level - would display different patterns of discourse. It is also possible that classes concerned with different subject matter fields, such as mathematics or one of the physical sciences, would proceed with patterns of discourse other than those found in the present study. Nevertheless, with these limitations in mind, it seems reasonable to generalize the findings to the academically oriented classroom at the high school level which is concerned with subject matter like economics. For these kinds of classes, the pattern of pedagogical discourse probably closely parallels the results of this study.

One way of conceptualizing these results is in terms of the language game of teaching and learning. Despite the fact that the rules of this game are not explicitly stated for any of the players, our sample of teachers and pupils obviously followed a set of implicit rules with few deviations. These rules define the teaching game. Although classes differ somewhat in details, for the purposes of an initial description of the classroom game, the results strongly support the assumption that common elements underlie much of the teaching game in that pupils and teachers follow a consistent pattern of language rules. It is as if the grammar of English had never been explicitly written, yet everyone generally spoke in essentially the same grammatical forms. It may be useful, therefore, to summarize these rules explicitly, _not as a prescriptive guide to future teacher behavior_, but rather, as a descriptive model of what actually occurs in classrooms like those in the present study.

THE CLASSROOM GAME

The classroom game involves one person called a teacher and one or more persons called pupils. The object of the game is to carry on a linguistic discourse about subject matter, and the final payoff of the game is measured in terms of the amount of learning displayed by the pupils after a given period of play. In playing the game, each player must follow a specific set of rules. If one plays the role of teacher in this game, he will follow one set of rules; if one plays the role of pupil, he will follow a somewhat different, though complementary, set of rules. One is permitted some deviations from these rules and the subsequent pattern will characterize one's individual style of play. These deviations, however, are infrequent and are relatively minor in comparison to the general system of expectations. In fact, the first rule, which might be called "the rule of rules," is that if one is to play the game at all, he will consistently follow the rules specified for his role. Otherwise, the game cannot be played.

Within the general set of rules defining the game, there are individual differences among teachers and classes in style of play. In one classroom, the teacher may specialize in one kind of move or sequence of moves, while in another class the teacher may specialize in a slightly different pattern of discourse. Notwithstanding these variations in style and differences in specialization of moves, the game is always played by a consistent set of general rules. These are rarely made explicit during the course of play; more often, they are defined implicitly by the sequence of moves that actually occurs. Regardless of whether they are explicit or implicit, both teachers and pupils are responsible for playing by the rules of the game.

These rules will be presented in the following order: (1) rules for the role of teacher; (2) rules for the role of pupil; and finally, (3) general rules for all players.

Rules for the Teacher

If one plays the role of teacher in this game, he will obey the following rules:

1. The teacher will be the most active single person playing the game. This means that he will make the most moves; he will speak most frequently and his speeches will usually be the longest. He is permitted some flexibility in the exact amount by which his activity exceeds the total activity of all other players, but in general, the ratio of his speech to the speech of all other players will be 3 to 1 in terms of amount spoken, and 3 to 2 in terms of the number of moves made. Moreover, these ratios will remain constant over several class sessions,

unless he directs another player to assume his role temporarily.

2. The teacher is responsible for structuring the form and content of the game. He will specify the subject matter of the game, and the rules for the game. Within any particular setting, as in various baseball parks, there will be specific ground rules. The teacher is responsible for setting these ground rules and for making them explicit to the other players. In addition to setting up the initial structure of ~~the game~~, the teacher is responsible for launching new topics of discussion and for determining any changes that might occur in the form of play as the game proceeds.

3. The most frequent move of the teacher is called "soliciting." This is a directive move designed to elicit a specific response from the players called "pupils." Frequently, this move will be formulated in terms of a question, but may also be phrased in terms of a direct order, such as directing another player to speak, to open his book, or carry out any other action relevant to this game. If one plays the role of teacher, he is required to obey "the rule of proper questions;" that is, he must ask valid questions, stated in a logical form and concerned with substantive material so that some pupils in the game may be expected to answer. His intent must not be to trick the other players or pose impossible problems, but, rather, to formulate solicitations which will elicit from pupils legitimate responses that will move the game along.

4. After making a soliciting move, the teacher will normally expect a person playing the role of "pupil" to respond. It is then the teacher's responsibility to react to this response. Sometimes, he may react nonverbally, by nodding his head or perhaps by showing approval

implicitly by moving to a new solicitation. In most instances, however, he is expected to react in an explicit fashion. Many of these reactions will be evaluative; that is, the teacher is expected either to approve or disapprove of the response made by the pupil player. In the majority of instances, his reaction will be at least somewhat positive. Frequently, he tells a pupil explicitly that he has made a "correct" or "good" response; in any case, he is expected at least to "admit" the pupil's statement, often by a short phrase such as "all right." When the teacher is forced, by the obviously incorrect nature of the pupil's response, to make a negative evaluation, usually he will not make this evaluation completely negative; that is, by reacting with such remarks as "No," or "You're wrong." Rather, he will offer some sort of qualifying evaluation, such as "Yes, but...," or he will point out that the pupil's preceding response was not entirely correct or to the point.

5. In addition to reacting to immediately preceding statements, the teacher is also responsible for occasional summaries of larger parts of the discourse. This may simply be a repetition of several preceding responses or some form of integration of the earlier discourse. In this respect, he is free to choose either the more repetitive or the more integrative style. When speaking the role of the teacher, one also has freedom to introduce, in summarizing reactive moves, additional logical and substantive meanings. Thus one may summarize by mere repetition, by more active integration, or by either repetition or integration plus additional meanings.

6. Although either the teacher or the pupil may express substantive and substantive-logical meanings, it is, primarily, the teacher

who is responsible for expressing meanings relevant to instructional processes. A large proportion of these "instructional moves" will be reactions which are metacommunicative: reactive statements about another player's preceding statements. This sort of metacommunication is almost entirely within the teacher's domain of play; unless requested to do so, pupils will rarely make this kind of statement. Because metacommunicative statements are made rather infrequently in linguistic games outside the classroom, the teacher must take particular care in making them. For example, if one speaks the role of the teacher in the classroom, he will undoubtedly be required to play other games outside of the classroom with principals, supervisors, superintendents, etc. When playing this outside game, in contrast to his classroom role, it is likely that the teacher will not normally make reactive metacomments to the principal: telling him that he is wrong, his statement is false, or his response is off the point. But in playing the classroom game, this is one of his primary responsibilities, aimed at shaping the responses made by other players so as to bring them more into line with his expectations.

Other kinds of instructional statements made by the teacher will concern classroom procedures to be followed in playing the game and assignments to be prepared by students. From an instructional-logical point of view, these will consist largely of stating facts or making straightforward directive statements telling the pupils what to do. Rarely will the teacher ever express an opinion about instructional meanings or justify any opinions he might state about them.

Rules for the Pupil

If one speaks the role of the pupil, his responsibilities in playing the game are much more restricted than those of the person playing the role of teacher. The pupil must remember that his eventual performance on some measure of learning determines the final payoff of the game both for him and for the teacher; therefore, it is assumed that he will learn. Regardless of whether one learns, if he speaks the role of the pupil, he will obey the following rules:

1. The pupil's primary task in the game is to respond to the teacher's solicitations. This usually involves answering specific questions posed by the teacher, but may also involve following direct orders given by the teacher, such as "Open your book," or "Get up and shut the window." Whenever the teacher makes a soliciting move, the pupil will, if at all possible, attempt some form of response. The response may be right or wrong in terms of the teacher's expectations; it may be relevant or irrelevant to the ongoing game. In any case, the pupil is required to attempt some response to the teacher's solicitation. In extreme cases, the pupil may reply to a solicitation by saying, "I don't know" but this should be used rarely, if at all. The best policy for the pupil to follow in playing the game is "make a response whenever called upon."

2. The pupil does not structure the game; that is, he does not tell the teacher and other pupils what the game is to be about or how to play it. This is the task of the teacher. Occasionally, the pupil is called upon to give a report or to participate in a debate. This is a form of structuring, but pupils make such moves only when directed to do

so by the teacher. Having fulfilled his assigned structuring obligation, the pupil will not structure again unless the teacher specifically directs him to do so.

3. In general, the pupil will keep his solicitations to a minimum. If he must solicit, he will restrict his questions to instructional matters. If absolutely necessary in order to continue playing the game, he may ask the teacher to clarify an assignment or explain some instructional procedure involved in the game. On the other hand, he does not solicit in regard to substantive matters, and certainly never makes a directive statement to the teacher such as "Speak" or "Get up and close the window." If the pupil makes such a solicitation, it is likely that he will be excluded from the field of play.

4. Even more important than the don't solicit rule is the don't react evaluatively rule. Under no condition is the pupil permitted to react evaluatively to a statement made by the teacher; that is, the pupil does not tell the teacher he is right or wrong, that he is doing well or doing badly. If the pupil has impulses in this direction, he must inhibit them, for they have no place in the classroom game. This applies both to positive and to negative evaluations of the teacher. Occasionally, the pupil may be asked to react evaluatively to another pupil's response. If asked to do so by the teacher, he may make this move; it should be brief and probably should not be too strong either in a positive or in a negative direction. Although not exactly achieving the status of a rule, the pupil should keep whatever evaluations he is asked to make as bland as possible.

5. A corollary of the "don't react evaluatively" rule is the general principle, "within the classroom, teachers speak The Truth." This principles holds by virtue of the teacher's role in the game and the rules guiding pupils' play. Except under extraordinary circumstances, pupils overtly accept the teacher's statements as the spoken truth.

On the other hand, pupils may or may not speak "The Truth." If one speaks the role of pupil, he must remember that merely uttering a statement does not guarantee that it will be accepted as true. In fact, an important part of the teacher's responsibility is to challenge, though mildly, pupils' statements which he believes to be invalid. In certain classes, pupils may even be challenged occasionally by other pupils.

6. In some classes, pupils are expected to make reactions that carry no explicit evaluative meaning. This will depend upon the ground rules established by the teacher. The only guide one can follow is the expectation of the teacher: does he or does he not expect the pupil to react to other pupils' statements?

7. Finally, a pupil player should remember that his primary task is to respond to the teacher's solicitations and to perform well on the final payoff test. If he fulfills both of these obligations and does not usurp the role of the teacher, then he will most likely play the game successfully.

Some General Rules for All Players

In addition to the rules related to a specific role, there are some general rules that apply to all players. Regardless of the particular role one plays, he will obey the following rules:

1. The major part of the game will be played with the substantive meanings specified by the teacher's structuring of the game. From time to time, however, either player is permitted to wander from this central focus, sometimes to topics relevant to the substantive core of the game and occasionally to a topic which is thoroughly irrelevant to the principal subject matter. The teacher will usually initiate these off-target discussions, sometimes as a means of introducing or clarifying a substantive point. Occasionally a pupil player is permitted to introduce an irrelevancy, but this must not be done often in a single class session. The exact frequency depends upon the reactions of the person playing the role of teacher. In general, however, the discussion will take place within the substantive framework of the teacher's structuring.

2. From a substantive-logical or instructional-logical point of view, if the game is played within the substantive area of economics, or in any related subject area, the discourse will consist largely of empirical meanings. This means that for the most part, the moves will be statements either of fact or explanations; approximately 50 to 60 per cent of the speech will involve empirical meaning. Analytic meaning involving either definitions of terms of interpretations will be expressed much less frequently. The frequency of evaluative statements will also be relatively low in comparison to empirical statements. Thus, expressions of personal opinion about economic policies or attempts to justify opinions will appear relatively infrequently. Players will, however, be free to report opinions of others, such as public figures, or to report the arguments used by others to justify their opinions. This does not mean that players are completely prohibited

from expressing their own opinions and justifications, but that the general policy under which the game is played encourages the use of statements with empirical meaning.

3. As indicated in the preamble to this set of rules, one is permitted some deviations from the specified set of rules. In almost all instances, the range of these deviations depends upon the ground rules set by the teacher, which may be either explicit or implicit. In any event, one is responsible for learning and obeying these ground rules; for example, a teacher may vary his style of play so that he spends most of the game structuring, while the pupil's main task is simply to attend to the structuring and to respond whenever called upon to do so. A teacher may, on the other hand, choose to play the game principally as a question and answer exercise; if he so chooses, he is also responsible for reacting to pupil answers. The teacher may even choose a style of play characterized by a proportion of reactions larger than that usually seen in this game. If a pupil is indeed playing the game with such a teacher, his responsibility to react may be almost as compelling as his responsibility to respond. Thus, within the general rules of the game, the style of play may be modified in one way or another. Once the ground rules for a particular game have been set, however, it is wise neither for the teacher nor for the player to assume the other player's role. If one plays the role of teacher, part of his responsibility will be to set the ground rules and to see that these rules are obeyed in playing the game. In this sense, the teacher is expected to serve not only as coach and one of the players, but also as referee of the game. On the other hand, if one plays the role of pupil, he must learn the

ground rules of the game even if the rules are not explicitly stated by the teacher.

4. In gauging wins and losses, players must remember that this is not a game in which one player, such as the teacher, wins while another player, such as one of the pupils, loses. Rather, there are relative degrees of winning and losing, and the teacher's winnings are a function of the pupils' performances. This is a peculiar, but important, characteristic of this game. While the teacher undeniably has the greater power and freedom in the course of play, he is ultimately dependent on his pupils for the degree of success he achieves in playing the game.

This feature of the game is a consequence of the criterion of success. The eventual aim of the game, the ostensible reason for the play, is the pupil's learning of substantive and substantive-logical meanings. Learning is usually measured by test performance; therefore, the teacher's success depends upon the pupil's test performance. If a pupil fails the test, implying that he has not learned, then the teacher, by implication, has not taught successfully. Thus, insofar as that pupil is concerned, the teacher has lost the game. A single teacher, of course, typically plays the game with many students, so that his wins and losses are scored over the total group of pupils, much as the team point system is used to score track meets. In calculating the results, several test failures may be offset by a number of brilliant test scores, although the precise formula depends upon the educational setting in which the game occurs. For some schools, success requires at least minimal performance by all pupils; in such schools, the teacher's overall score is considerably reduced for even one or two test failures, with proportionately less credit for high test scores. For other schools, a few exceedingly high scores overbalance a substantial number of low test results. In this latter setting, a few special pupil prizes, awarded by outside sources such as "Regent Scholarships" and "Merit Scholarships," may very well counterbalance many failures.

The general formula for computing a teacher's final score cannot be written because the weights assigned to various kinds of test scores depend upon other games played by other people. These outside players are called principals, superintendents, and school board members, and it would be wise for a person, when he begins to play the teaching role in a given setting, to determine the formula for success used by these outside players.

It is of historical interest to note that the general definition of success has changed over the years. Earlier forms of the teaching game were like other competitive games in which one person wins and another loses; the teacher was pitted against the pupil much like a baseball pitcher is pitted against the batter. But just as whist gradually evolved into bridge, the competitive type of the teaching game has changed to a more mutually dependent form of play.

In summary, it should be remembered that these are the rules of the game _as it is played, not necessarily as it should be played_. At this point, the concern is only with a description of the classroom game, and this description is summarized in the rules of the game. Depending upon one's opinion about what should occur in a classroom, the rules specified may or may not serve as prescriptions of teacher and pupil behavior. Regardless of any set of prescriptive guides that one might view as desirable, the rules thus far specified are based on a detailed analysis of what actually happened in the classrooms sampled.

BASIC PATTERN OF PEDAGOGICAL DISCOURSE

Having stated the rules of the language game played in the classroom, it may be useful to consider the sequence of pedagogical moves that occurs most commonly in the typical game. This sequence begins with a teacher's solicitation and is followed by a pupil's response, to which the teacher often reacts. In other words, the core of the teaching sequence found in the classrooms studied is a teacher's question, a pupil's response, and, more often than not, a teacher's reaction to that response.

This hardly seems like an earth-shaking finding; but perhaps its very obviousness has obscured its central role in the pedagogical process. For if this is indeed the core of what actually happens in the classroom, it would seem reasonable to focus both training and research specifically on this sequence of teacher-pupil interaction. In fact, the significance of this sequence of pedagogical moves was probably recognized 40 or 50 years ago in teacher training, when a substantial part of the technical education of teachers was concerned with the skill and art of asking question. The Socratic method, of course, is essentially the art of asking question, so that the basic pattern of pedagogical discourse found in this research reflects a long tradition of educational technique. For some reason, however, in more recently developed programs of teacher training, the importance of the question-answer sequence frequently followed by a reaction has somehow become obscured in comparison to other aspects of the pedagogical process. The purpose of this research was not to prescribe this or any other sequence as the most effective pattern of teaching. But the data seem to indicate that this sequence is indeed the core of pedagogical discourse, at least insofar as this sample of classes permits generalization.

In a sense, the nucleus of this sequence is the teacher's solicitation. According to the rules of the game, once the solicitation has been made the pupil's response almost inevitably follows, and this is likely to be the occasion for a teacher's reaction. In fact, the frequency of teacher's soliciting moves approximately determines the proportion of moves which occur in each of the other pedagogical categories. Since a teacher's soliciting move is normally followed by a pupil's response, these two categories of pedagogical moves, for any given class, must have approximately the same proportion of entries. It follows that since the teacher's responsibility, to some extent, also involves reacting to pupil's responses, the category of teacher solicitations also determines the approximate percentage of entries in the reaction category. Assuming that the discourse requires some degree of structuring, usually about 10 per cent of the total discourse, and that other kinds of moves, such as pupil reactions, occur occasionally, it follows that the bulk of the discourse involves the core of teacher solicitations, pupil responses, and teacher reaction. Indeed, in the data reported here, these categories account for about 75 per cent of the moves made in any class.

Obviously this line of reasoning is based on a _post_ _hoc_ analysis of the data, and any evidence offered from these data in support of this view clearly must be circular. Notwithstanding this circularity, the fact remains that these pedagogical moves represent the common core of interaction between teachers and pupils in all classes sampled. Certainly the generality of this finding must be further tested with classes in a wide range of settings. If this sequence does indeed define a general pattern of classroom discourse, it would be of paramount importance to investigate this sequence of moves in greater detail, to evaluate its pedagogical effectiveness, and to devise methods of increasing the effectiveness and efficiency of both teacher's solicitations and reactions.

That the question and answer pattern of interaction is a fundamental part of classroom discourse is obvious from the data. But one can only speculate about why this is so consistently the common pattern of discourse. Perhaps high school teachers have found this to be the most effective method of instruction. One might view this as a kind of pragmatic evolution, a process by which the most effective techniques have survived through years of usage. In a sense, this suggests a blind evolution, or at least nonrational development uninfluenced for the most part by rational foresight. On the other hand, this pattern of teaching may be based on teachers' assumptions about how high school pupils learn; that is, teachers may assume that if they lectured a great deal, which is more characteristic of classes at the college level, pupils would tend to become bored. Teachers may also assume that if much of the class time is devoted to pupil reaction, such a process might degenerate into a sharing of ignorance.

In a more positive vein, teachers may assume that students "learn by doing." Following Dewey's general point of view, their aim is, therefore, to stimulate and guide this "doing" by repeated solicitations. From this point of view, classroom discourse may be seen as a rehearsal of cognitive processes or, in short, an opportunity to practice thinking. As Dewey has suggested, since thinking begins with a problem, one way for the teacher to encourage pupils to think is to pose a problem in the form of a question. Thus, the aim of teaching is to stimulate and shape the pupil's cognitive responses. The teacher stimulates and directs the response by posing a problem which initiates the pupil's thinking; that is, by asking a question. The teacher further shapes this response by his subsequent reactions.

Another possible explanation concerns the end point or payoff of the teaching game. In most instances, this payoff is the pupil's learning as measured by a test. If a pupil does well on the test, which presumably shows that he has learned, both the pupil and the teacher win the game. Similarly, if the pupil fails the test, which presumably shows that he has not learned, both the pupil and teacher lose the game. If this is indeed the case, one might view the classroom discourse as preparation or rehearsal for the payoff test; thus, the teacher conducts the class in essentially the same form in which a test is presented in order to maximize transfer to the test situation. The discourse, therefore, might be viewed as a series of micro-tests in preparation for the final testing situation.

None of these speculations can be proposed with a high degree of confidence, and certainly the data do not warrant choosing one set of speculations over another. Perhaps all of the factors discussed influence the pattern of classroom discourse to some extent. In any event, the more important issue concerns the further investigation of this pedagogical pattern of interaction and a careful evaluation of its effectiveness in terms of specific consequences.

FURTHER RESEARCH

This research proposed to describe the language of the classroom, and from the analyses of the data a rather consistent and stable pattern of discourse has emerged. The task of further research is to explore in greater detail this pedagogical pattern of interaction. Several promising lines of further investigation have become apparent.

Problems For Further Research

1. One of the most important lines for continuing research concerns the reformulation of the antecedent-consequence nature of research in this area to recognize the need for descriptive studies both of the classroom and of outcome variables. Instead of investigating various dimensions of classroom behavior in relation to some arbitrary measure of "learning," it may be more useful in the long run to formulate investigations in terms of the general question, "If a given set of events occurs in the classroom, then what are the observable outcomes?" For this kind of research, the usual tests devised to measure "learning" probably will not be adequate. At the beginning, at least, one would want to explore as fully as possible a wide range of possible outcomes, perhaps using a variety of interview techniques to collect data from pupils and, on the basis of such information, gradually to develop more

formalized instruments which probably will be considerably different from the kind of measure used in the present study.

2. The analysis of emotional meaning also suggests a promising line for further research. At this point, it is reasonable to conclude that teachers can be characterized by relatively stable aspects of emotional style. There is some evidence that the dimensions of activity and strength in this emotional style are related to outcome measures. We cannot generalize these findings beyond the present sample of classes, but at least this research has developed a potentially useful technique for further investigation of the emotional aspects of meanings expressed in the classroom.

3. For purposes of the present research it was sufficient to identify the four types of pedagogical moves and to define their function in general terms. The results suggest, however, that more detailed study of the ways in which these functions are actually performed by teachers and students in the various classes will add important information about the nature of pedagogical discourse. If teachers' solicitations are indeed the nucleus of pedagogical discourse, then obviously this type of move demands much more intensive research. Study of solicitation-response patterns of interchange to determine the kinds of responding behaviors that follow certain kinds of solicitations, together with the investigation of characteristics and functions of structuring and reacting moves, is needed if the general line of research indicated by the present study is to lead to concrete improvements in teaching.

4. Certain lines for further investigation are suggested by the

analysis of teaching cycles. Just as the concept of teaching cycles was derived from the grouping of pedagogical moves, it may be desirable to group teaching cycles into still larger units of classroom discourse. These larger units may help one to see relationships among cycles in the same way that teaching cycles help one to see the relationships among pedagogical moves. In this way, attention could be focused on the sequence of linguistic events in the classroom.

One way of studying these sequences is through Markov chains defined as a "mathematical model for describing a certain type of process that moves in a sequence of steps through a set of states" (6:128). Taking each teaching cycle as a state, the probabilities of moving from one type of teaching cycle to another could be investigated. Another approach would involve identifying those initiatory moves (structuring or soliciting) which inaugurate long or pedagogically meaningful units of discourse. Significant dimensions of these segments of linguistic behavior could then be identified and analyzed. Thus, while teaching cycles may be regarded as teaching tactics, combinations of cycles may be seen as teaching strategies.

5. With appropriate modifications in the categories labeled "substantive meanings", the system of analysis devised in this research provides a potentially useful technique for investigation of classroom teaching in a variety of high school subjects such as English, social studies, mathematics, and science. The results of such studies together with the findings of the present research would provide a basis for comparing and contrasting the patterns of teaching in the four subjects traditionally included in the high school curriculum.

6. Although the present research was concerned with patterns of pedagogical discourse in the high school classroom, the question arises whether the method of analysis is also useful in studying teacher-student interaction in elementary schools and colleges. Further research might, therefore, extend the study of classroom teaching to include elementary and college classes to determine whether the general approach developed in this study is applicable to these other levels, and what adaptations in the method of analysis are necessary when applied to these levels of instruction. It seems likely that the categories describing logical processes would require some modifications when applied to younger students in the primary and elementary grades.

Implications for Research Design

The design of this research was a compromise between rigorous experimental laboratory procedures and more informal techniques represented by typical case history methods. In retrospect, this seems to have been a fortunate compromise, in that the data clearly reflect the complex interactions of actual, ongoing classes; yet the research procedures permitted sufficient control to yield results that could be treated within practical limits and interpreted with reasonable confidence.

When one views classroom interaction from a research perspective, he is confronted with a complex maze of interrelated phenomena. Twenty or thirty people are continually interacting in a variety of multi-determined ways, each action dynamically influencing subsequent events. The entire process rapidly and constantly changes while the researcher tries to identify meaningful dimensions of observation. In part, it is probably this extraordinary complexity which has mitigated against research in classroom settings and has led scholars to view educational problems either from a more philosophical position relatively independent of controlled empirical investigations, or from the perspective of highly artificial laboratory conditions.

Certainly both points of view have much to offer in the search for knowledge about the teaching process. The present research clearly illustrates this premise. It began with the concept of language games developed in the philosophical work of Wittgenstein and others and relied heavily on analytic philosophers, such as Feigl, in devising the categories of meaning. Yet throughout the research, the interplay between theoretical concepts and empirical data was of the utmost importance. While the initial theoretical concepts guided attempts to observe and describe the complex events of classroom interaction, the daily confrontation of these concepts with the primary data of actual classes led to revisions and refinements of earlier notions that would have been impossible without the constant check of the empirical material.

This study also borrowed from the tradition of laboratory research. Although it was not possible to achieve the kind of rigorous control often established in certain types of experimental investigations, the research procedures of this study offered at least a modicum of both statistical and experimental control of the data using techniques paralleling those of the laboratory. Without such controls, one could hardly deal meaningfully with the complex phenomena of the classroom. The complexity itself, however, suggests that the inevitable simplification of laboratory research precludes a realistically meaningful view of the teaching process. In the typical psychological learning experiment, for example, subjects are selected for the particular study on the basis of certain relevant criteria, but, in most instances, the interaction of the experimenter and subjects begins and ends with the experiment. In contrast, the teacher and pupils in each of the classrooms sampled in this research had a history of interaction together, and this research was only a short time sample in that history. Undoubtedly, the events observed in this time sample were inextricably related to events prior to the classes' participation in the research, and in a sense, the unique tradition of each class was part of the problem under investigation. If an "experimental" teacher had been introduced in each classroom; if the experimental unit had been completely independent of the course of study; if the research had been conducted in laboratory rooms specially designed to increase sound fidelity of the recordings, certain experimental advantages would have been gained. But the study would not have been a study of actual classroom interaction.

The research procedures, without doubt, influenced the behavior of teachers and pupils; probably few people are totally unaffected by the presence of apparatus that is recording every word spoken. But efforts were made in the direction of minimizing such distractions. Observations made during the study suggest that, by and large, this aim was accomplished with a fair degree of success.

To some degree, the procedures used by different researchers to investigate the same general problem are a matter of personal taste or professional style. Indeed, at the current stage of knowledge about the teaching process, a variety of widely different approaches to the same problem is probably desirable. Nevertheless, experience in this study would suggest that studies within actual classroom settings, with some degree of control, is an especially useful mode of investigation in this area of research.

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APPENDIX A

CODING INSTRUCTIONS

1. General Coding Instructions

1.1 Coding is from the viewpoint of the observer, with pedagogical meaning inferred from the speaker's verbal behavior.

1.2 Grammatical form may give a clue, but is not decisive in coeing. For example, SOL may be found in declarative, interrogative or imperative form. Likewise, RES may be in the form of a question -- frequently indicating tentativeness on the part of the speaker.

1.3 All missed statements and all noncodable statements (e.g. er, ah, mmm, well..., etc.) are coded T/NOC or P/NOC. Partially missed statements are coded only if there is enough information to code the pedagogical move, the substantive-logical meaning and/or the instructional meaning and instructional-logical meaning. Those moves immediately following a move coded T/NOC or P/NOC are coded as usual, if the context is clear and unambiguous. If alternative codes are clearly possible, code T/NOC or P/NOC for these moves also.

1.4 A line of discourse is a four and a half inch segment of transcript in elite type.

1.5 All complete utterances of less than one line are counted as one line.

Examples

T: Yes. (1 line)

T: Rubber. (1 line)

1.6 In longer utterances, the final line segment is counted as one line if it exceeds half the line. If it does not, it is discounted.

Examples

T: Well, it has more to do, Kenny, with
the problem of being self-sufficient
in case of war. (2 lines)

T: What does he plan to do with the
industries that might be hurt? (2 lines)

1.7 In utterances that comprise more than one pedagogical move, partial line segments (underlined below) are combined in determining the line count.

Examples

T: Correct. / Can you think of any other REA (1 line)
way that we can approach this big
problem of tariffs? SOL (2 lines)

T: That is perfectly correct. / Briefly, now, REA (1 line)
I'd like to turn to a completely dif-
ferent subject. STR (2 lines)

1.8 In utterances that contain more than one pedagogical move, each pedagogical move is counted as at least one line.

Example

We trade much more with large in-
dustrialized countries. / Right? RES (2 lines)
SOL (1 line)

2. Pedagogical Moves

2.1 The postscript - M is added to the coding of a pedagogical move when the speaker resumes the same move after it has been interrupted or mediated by one or more intervening pedagogical moves. If the interlarded move is ambiguous (e.g. mmm, er, ah), code it T/NOC or P/NOC.

Examples	Code
P: Well, if you get 4 billion dollars each year ...	P/SOL/TMB/XPL/2/-/-/-
T: Mmmm.	T/NOC/1
P: ...how are you going to pay it off?	P/SOL-M/TMB/XPL/1/-/-/-
P: How can we have a balance, a favorable balance of trade...	P/SOL/TMB/XPL/2/-/-/-
T: Yes	T/REA/TMB/-/-/STA/POS/1
P: if we lose 4 billion dollars of gold each year?	P/SOL-M/TMB/XPL/1/-/-/-

2.2 A SOL begins with the first manifestly eductive statement and ends with:

a. The end of the utterance

b. The beginning of a STR, RES, or REA

2.3 Solicitations that give someone permission to speak (acknowledging SOL's) are coded: T/SOL/IMX/-/-/ACV/PRF/1

Example	Code
T: Allan?	T/SOL/IMX/-/-/ACV/PRF/1
T: Yes?	T/SOL/FOD/-/-/ACV/PRF/1

Acknowledging SOL's are not coded separately when they occur in connection with another solicitation.

The only type of response (RES) that can follow this kind of SOL is a RES-M, but any other kind of pedagogical move may occur.

2.4 Tentative and optional assignments, as well as prescribed ones, are coded as SOL's.

Example	Code
T: Somebody might be interested in examining the Purdue Poll on Teenagers. There's a booklet on the American teenager in the library. Any one of you might be interested in examining how teenagers feel about different topics.	T/SOL/NTR/-/-/ASG/PRF/6

2.5 When checking statements (e.g. "Follow Me?" "Get it?") occur within a STR or a REA, SOL is not coded unless there is a pause or verbal cue indicating a RES is expected. Such statements when they occur within a larger move do not appear as part of the code for the larger move.

2.6 Implicit in any SOL is the concept of knowing or not knowing. Therefore, code RES for any one of the range of possible responses (including invalid ones), and also for any reply referring to knowing or not knowing (e.g. "I don't know.")

2.7 Occasionally a teacher or student responds to a SOL with a question. Coding in these instances is in terms of context and intent. For example, students frequently respond with a question to indicate the tentativeness of their responses. These are coded RES. If, however, the 'responding' question is a genuine solicitation (i.e., expects a RES), it is coded SOL.

2.8 A SOL which calls for a fact is coded FAC, but if the RES gives both a fact and an explanation, the substantive-logical meaning of the RES is coded XPL.

Example	Code
T: What do we import from Bolivia?	T/SOL/IMX/FAC/1/-/-/-
P: We import tin from Bolivia because we don't have any in this country.	P/RES/IMX/XPL/2/-/-/-

2.9 A SOL which calls for an opinion is coded OPN, but if the RES gives both an opinion and a justification, the substantive-logical meaning of the RES is coded JUS.

Example	Code
T: Should we lower our quotas?	T/SOL/TRA/OPN/1/-/-/-

P: No, because it would hurt the American businessman.	P/RES/PFT/JUS/1/-/-/-

2.10 Responses are normally coded as having been elicited by the immediately preceding pedagogical move. When the solicitation which elicits the response occurs earlier in the discourse, the postscript -M (i.e., SOL-M) along with a numeral indicating the position of the soliciting move, is added. The number is determined by counting back to the last explicit expression of the solicitation.

Example	Code
T: Come on. Mention another economic group that we belong to.	T/SOL/TRA/FAC/1/-/-/-
P: Monetary Fund	P/RES/TRA/FAC/1/-/-/-
T: Monetary Fund	T/REA/TRA/-/-/STA/RPT/1
P: UNICEF	P/RES-M3/TRA/FAC/1/-/-/-
T: UNICEF	T/REA/TRA/-/-/STA/RPT/1
P: UNESCO	P/RES-M5/TRA/FAC/1/-/-/-
T: UNESCO	T/REA/TRA/-/-/STA/RPT/1
P: WHO	P/RES-M7/TRA/FAC/1/-/-/-

2.11 A speaker cannot respond to his own solicitation. (1) If the speaker answers his own question immediately after asking it, the question is taken to be rhetorical and a stylistic device rather than a true SOL. (2) If a speaker answers his own question after an intervening incorrect answer, the correct answer to the solicitation is coded as a reaction to the incorrect answer, since the purpose of the question was not to elicit a response from the questioner. (3) If a speaker answers his own question after a pause, the answer is coded as a reaction, indicating that the speaker is primarily reacting to the absence of an expected response. An asterisk is indicated as part of the coding of the REA (i.e., REA-*) when this occurs.

Example	Code
T: Now what is the escape clause then?	T/SOL/BAT/DEF/1/-/-/-
(pause) The escape clause, then, is the provision in all of our reciprocal acts which provides that if imports come in under the Reciprocal Act in too great a quantity, and large enough to cause severe damage to any particular industry, anyone in industry may petition the Tariff Commission to have the rate put back up where it was before.	T/REA-*/BAT/DEC/9/-/-/-

2.12 The postscript -P is added to the coding of reactions (i.e., REA-P) when the reaction is occasioned by a physical action rather than a verbal action.

Example	Code
T: Who can raise your hand...in what respect we have discussed the European Common Market this year	T/SOL/PFT/-/-/PRC/FAC/3
...not quite so many hands now.	T/REA-P/PFT/-/-/ACP/FAC/1

2.13 A reaction begins at the beginning of an utterance or following a nonverbal response or the absence of an expected move.

A REA is still in progress when the speaker:

a. Evaluates or otherwise discusses a previous move

b. Rephrases a previous move or makes reference to it

c. Expands a previous move by stating its implications, interpreting it, or by drawing conclusions from the same point or sub-point

A REA ends when any of the following occurs:

a. The utterance ends

b. A SOL begins

c. The speaker indicates the end of the REA by some verbal convention, such as, "All right, now let's turn to...;"

d. A distinct (not parenthetic) shift occurs to another substantive area not heretofore mentioned or not under immediate discussion.

e. A distinct (not parenthetic) shift occurs from any substantive category to an instructional category not heretofore mentioned or not under immediate discussion.

2.14 When a reaction (REA) to a verbal move is followed by a summary reaction (REA), both reactions are coded separately even when they occur within the same utterance.

2.15 A brief or passing reference to what has gone before does not constitute a summary reaction (REA). REA is coded for a genuine summary or review and/or for a reaction to more than one move.

2.16 REA frequently occurs when a teacher concludes a unit of discussion and moves to something new. In these instances, it is necessary for the coder to determine when the summary ends (REA) and the focusing on new material begins (STR) and to code appropriately.

2.17 A reaction to a solicitation occurs only when the reaction is about the solicitation and not a response to the solicitation.

Example	Code
P: Why don't we raise our tariffs too?	P/SOL/BAT/XPL/1/-/-/-
T: That's a good question.	T/REA/BAT/-/-/STA/POS/1

3. Teaching Cycles

3.1 All teaching cycles are coded on the first pedagogical move of the cycle (STR or SOL).

Example	Code
	/6/18/5
T: Why do countries trade?	T/SOL/TRA/XPL/1/-/-/-

The first number (6) indicates that this cycle is the sixth in this session. The second number (18) indicates that the cycle is an example of cycle type 18 (SOL RES REA). The third number (5) indicates that there is a total of five lines of transcript in the cycle.

3.2 All acknowledging SOL's, that is, solicitations which simply give someone permission to speak, are ignored for purposes of coding teaching cycles. No cycles, therefore, can be initiated simply by calling a person's name. Acknowledging SOL's are excluded from the line count in the coding of teaching cycles.

3.3 When a teaching cycle is resumed after an intervening cycle, the moves are coded as part of the original cycle.

Example	Code
	/36/14/2
P: Do we export to Africa?	P/SOL/IMX/FAC/1/-/-/-
	/37/14/2
T: To where?	T/SOL/IMX/-/-/ACV/RPT/1
P: Africa.	P/RES/IMX/-/-/ACV/RPT/1
	/36/
T: Oh, a little.	T/RES-M3/IMX/FAC/1/-/-/-

Since the latter RES was elicited by the first SOL, it is coded as part of cycle number 36, not cycle 37.

4. Substantive Meanings

4.1 Coding of substantive meanings is in terms of the main context of the discussion. If, for example, in a discussion of direct foreign investment (FOD) a speaker mentions avoidance of tariffs as one reason for this kind of investment, the explanation is coded FOD. A shift to tariffs (BAT) is indicated only if the discussion actually centers on the nature of tariffs, the kinds of tariffs, etc.

4.2 In coding, indicate whenever possible the substantive content to which the move refers or the substantive context of the move. The speaker may or may not explicitly refer to the substantive material. The absence of substantive-logical coding in these instances indicates that no substantive meanings were actually expressed.

Example	Code
T: In what does this country specialize?	T/SOL/FSP/FAC/1/-/-/-
P: Heavy machinery	P/RES/FSP/FAC/1/-/-/-
T: Right.	T/REA/FSP/-/-/STA/POS/1
T: Turn out the lights, please.	T/SOL/PFT/-/-/ACP/PRF/1

5. Substantive-Logical Meanings

5.1 Only when defining is the main focus is a move coded as defining. When the definition is within the immediate context of other substantive-logical meanings, defining is not coded.

5.2 Responses giving facts within the context of an explanatory move or in a sequence of explanatory moves are coded explaining (XPL), except when the SOL which elicits the fact stating clearly calls for a fact, not an explanation. In the latter case, both the

SOL and the RES are coded fact stating (FAC).

Example	Code
T: What are the reasons most cars are made around the Detroit area?	T/SOL/FSP/XPL/2/-/-/-
P: The Great Lakes.	P/RES/FNR/XPL/1/-/-/-
T: What do the Great Lakes provide?	T/SOL/FNR/FAC/1/-/-/-
P: Transportation.	P/RES/FNR/FAC/1/-/-/-
T: They provide transportation for what?	T/SOL/FNR/FAC/1/-/-/-
P: Raw materials.	P/RES/FNR/FAC/1/-/-/-

5.3 'Reverse' definitions, which give the definition and call for the term, are coded as defining moves.

Example	Code
T: What do we call a tax on imports?	T/SOL/BAT/DEC/1/-/-/-
P: A tariff.	P/RES/BAT/DEC/1/-/-/-

5.4 When more than one substantive-logical process occurs within a single pedagogical move, code according to the following order of priority:

a.) JUS (justifying)

b.) XPL (explaining)

c.) OPN (opining)

d.) FAC (fact stating)

e.) INT (interpreting statements)

f.) DEF (defining terms)

5.5 An incorrect statement intended as the description of a state of affairs, such as, "Ghana grows most of the cotton produced in Africa," would be coded FAC even though it is empirically incorrect.

6. Instructional Meanings

6.1 Occasionally, within longer moves (e.g., a STR or a REA) reference is made to more than one of the instructional categories. In coding, identify the primary instructional function of the move or its principal focus, and code appropriately.

6.2 Use the following order of precedence when more than one of the instructional categories are involved and the main intent of the discourse cannot be readily determined:

a.) STA (statement)
b.) LOG (logical process)
c.) ASG (assignment)
d.) MAT (instructional material)
e.) PRC (procedure)
f.) PER (person)
g.) ACT (action-general)
h.) ACV (action-vocal)
i.) ACC (action-cognitive)
j.) ACP (action-physical)
k.) ACE (action-emotional)
l.) LAM (language mechanics)

6.3 MAT is coded without an instructional-logical category only when substantive material is asked for or given with reference to materials of instruction such as textbooks, films, graphs, and maps. MAT is coded only when the reference to materials is explicit.

Examples	Code
T: What does the book say we export most?	T/SOL/IMX/FAC/1/MAT/-/-/-
P: Agricultural products.	P/RES/IMX/FAC/1/MAT/-/-/-
T: According to this chart, what products do we have to import?	T/SOL/IMX/FAC/2/MAT/-/-/-
P: Rubber.	P/RES/IMX/FAC/1/MAT/-/-/-

6.4 ACC/FAC is coded when the cognitive process is the main intent of the move.

Examples	Code
T: Remember that?	T/SOL/TMB/-/-/ACC/FAC/1
T: You know that?	T/SOL/REL/-/-/ACC/FAC/1
P: I don't know.	P/RES/TDI/-/-/ACC/FAC/1
P: I can't seem to remember.	P/RES/FOR/-/-/ACC/FAC/1

6.5 ACC/FAC is _not_ coded when the reference to a cognitive process is incidental.

Examples	Code
P: I think we do have a quota on transistor radios.	P/RES/BAQ/FAC/1/-/-/-
T: I think it was Hamilton.	T/RES/BAT/FAC/1/-/-/-
T: As I recall, it's about 17%.	T/REA/IMX/FAC/1/-/-/-

6.6 Both ACC/FAC and the substantive and substantive-logical meanings are coded when the statement gives them approximately equal prominence.

Examples	Code
P: I'm not sure, but it's about 17%.	P/RES/IMX/FAC/1/ACC/FAC/1
P: I don't know, but I think we do have a quota on transistor radios.	P/RES/IMX/FAC/1/ACC/FAC/1
T: I can't remember exactly, but it's somewhere in Asia.	T/RES/FNR/FAC/1/ACC/FAC/1

7. Instructional-Logical Meanings

7.1 Use the following order of precedence in evaluative reactions when more than one instructional-logical categories are involved:

- a.) QAL (qualifying)
- b.) POS, NEG, PON (positive, negative, positive or negative)
- c.) ADM, NAD, AON (admitting, not admitting, admitting or not admitting)
- d.) RPT (repeating)

7.2 RPT is coded in evaluative reactions when there are no additional accepting, rejecting or qualifying statements.

7.3 In evaluative reactions, only explicit evaluations are coded.

Examples	Code
T: No.	T/REA/IMX/-/-/STA/NEG/1
T: You're not thinking.	T/REA/FOR/-/-/ACC/FAC/1
T: No. That's wrong. You're not thinking.	T/REA/TRA/-/-/STA/NEG/1
T: This can be in capital equipment which represents dollars.	T/REA/TMB/FAC/1/-/-/-
P: But it's never actually gold bullion.	P/REA/TMB/FAC/1/STA/QAL/1
T: Yes, it is.	T/REA/TMB/-/STA/NEG/1

7.4 Any indication of reservation with POS, NEG, ADM, or NAD is coded as QAL.

Examples	Code
T: You're right, but I'm not sure of your wording.	T/REA/IMX/-/-/STA/QAL/1
T: Well, I don't know whether or not your word "temporary" is the proper word to use, but you got the idea that the immediate effect of this, of course, is to put a lot of American workers out of jobs.	T/REA/PFT/-/-/STA/QAL/5

7.5 In STA/QAL reactions, code a minimum of one line as the instructional-logical segment of the move when additional substantive matter is included. If the move is only one line in length, code only as STA/QAL with nothing for the substantive-logical part of the move.

Examples	Code
T: Yes, but we export wheat.	T/REA/IMX/-/-/STA/QAL/1
T: Yes, but we never actually send gold bullion to these foreign countries.	T/REA/TMB/FAC/1/STA/QAL/1
P: But if we do continue to admit these cheap transistor radios, our American manufacturers will have to go out of business.	P/REA/BAR/XPL/2/STA/QAL/1

7.6 Interpreting (INT) is coded as instructional-logical meaning for clarifying solicitations and responses in which the speaker asks for or gives the referent or antecedent in a previous move.

Examples	Code
P: It's unconstitutional.	P/RES/TDI/FAC/1/-/-/-
T: What's unconstitutional?	T/SOL/TDI/-/STA/INT/1
P: He is in favor of joining the Common Market.	P/RES/PFT/FAC/1/-/-/-
T: Who is?	T/SOL/PFT/-/STA/INT/1
P: Macmillan.	P/RES/PFT/-/STA/INT/1
P: We all went up there to a meeting.	P/REA/NTR/FAC/1/-/-/-
T: Where?	T/SOL/NTR/-/-/STA/INT/1
P: Upstate New York.	P/RES/NTR/-/-/STA/INT/1

If, however, the speaker supplies the terms in which the response is to be phrased, code FAC as the substantive-logical meaning indicating additional substantive material of a factual nature.

Examples		Code
P:	We all went up there to a meeting.	P/REA/NTR/FAC/1/-/-/-
T:	Do you mean upstate New York?	T/SOL/NTR/FAC/1/-/-/-
P:	Yes.	P/RES/NTR/FAC/1/-/-/-
T:	What do we mean by the slogan, "Buy American--The job you save might be your own."?	T/SOL/IMX/INT/2/-/-/-
P:	The workers would be put out of jobs.	P/RES/IMX/INT/1/-/-/-
*T:	Do you mean American workers?	T/SOL/IMX/FAC/1/-/-/-
P:	Yes, American workers.	P/RES/IMX/FAC/1/-/-/-

(* "Did you say American workers?" would be coded ACV/FAC)

If the speaker requests or gives a clarifying response involving the definition of terms code DEF, DEC, or DED as appropriate.

Examples		Code
T:	The capital outflow has reached dangerous proportions.	T/REA/TMB/OPN/2/-/-/-
P:	What do you mean by capital outflow?	P/SOL/TMB/DEF/1/-/-/-

7.7 Code interpreting (INT) as the instructional-logical meaning when interpretations of graphs, maps, charts, or reading matter are involved.

Example		Code
T:	What does this yellow section stand for?	T/SOL/IMX/-/-/MAT/INT/2
P:	The amount of exports.	P/RES/IMX/-/-/MAT/INT/1

7.8 When the instructional-logical process performing (PRF) is used with instructional categories such as MAT, ASG, or PER it is always understood that an action is the referent and that this action is associated with the appropriate instructional category. Thus, when "Open your books" is coded MAT/PRF, the code is interpreted to mean "Perform an action associated with materials of instruction." The SOL, "Wash your face" would be coded PER/PRF and, interpreted, "Perform an action associated with your person."

APPENDIX B

THREE-PAGE EXCERPT FROM A PROTOCOL

T: However, to get back to our main point once more,
in talking about the U.S. role in, in all this
international trade. Our export trade is vital
to us. Our import trade is vital to us, and it
would upset and shake American economy to a
tremendous extent if we were to stop importing
or stop exporting. Let's turn to American in- T/REA/IMX/XPL/5/PRC/FAC/1
20/5/3
vestments abroad. You suppose we do invest much T/STR/FOR/-/-/PRC/FAC/1
money outside of the U.S.? T/SOL/FOR/FAC/1/-/-/-

P: Yes. P/RES/FOR/FAC/1/-/-/-

T: In what ways, in what fields? How would it be
21/18/7
done? T/SOL/FOR/XPL/1/-/-/-

P: Well, a lot of the big companies here in the
U.S. will set up companies over in other coun-
tries, and that way they can give the workers
over there a chance to work and to sell their
products and the foreign countries can get the
tax off that. P/RES/FOD/XPL/5/-/-/-

T: I think you put the most important thing last,
but that's true. The branch office in a foreign T/REA/FOD/-/-/STA/QAL/1
country, which involves the exportation of Amer-
ican capital, is so often done to avoid paying
22/14/4
what? T/SOL/FOD/XPL/3/-/-/-

P: Taxes. P/RES/FOD/XPL/1/-/-/-

T: What kind of taxes?
23/14/2
T/SOL/FOD/FAC/1/-/-/-

P: Import. P/RES/FOD/FAC/1/-/-/-

/24/14/2

T: Hm? T/SOL/FOD/-/-/ACV/RPT/1

P: Import. P/RES/FOD/-/-/ACV/RPT/1

T: Why would a company open up a branch in England,

/25/21/70

or Germany or France or Italy? T/SOL/FOD/XPL/2/-/-/-

P: Corporation won't have to pay tax? P/RES/FOD/XPL/1/-/-/-

T: No, if it's an American corporation it's still going to have a, have to pay corporation tax over here. It might save a little bit on the income earned by its branch office until it brings that income back to this country it is not taxed, but ultimately it would be. But it's a different kind of tax. T/REA/FOD/XPL/6/STA/NEG/1

P: The tariff. P/RES-M3/FOD/XPL/1/-/-/-

T: The tariff. We're not the only country in the world, you know, that has a tariff. If we want to send our goods inside... Well, take tobacco, for example. Most countries in the world have placed a very, very high tariff on American cigarettes coming in. They don't want their people to buy our cigarettes. And I mean it's expensive in some countries. You go across Europe and try to buy American cigarettes--they're available but you pay an enormous

price. You usually pay at least twice what you pay for a pack of cigarettes here. If a pack of cigarettes here id 30¢, it's about 60¢. Why, in, in Canada some American brands go as high as 70 -- I've paid 75¢ in Canada for a pack of American cigarettes. This is some years ago, but this is called the duty, the tariff. Now, if you open a branch and you ship in the raw tobacco and you manufacture the cigarette in, say, Germany, give it a different name but let it be known that it's American tobacco, which people would recognize, anyway. If they liked the taste, you avoid that tax. I've forgotten.... T/REA/FOD/XPL/22/STA/RPT/1
/26/14/3

P: Why can't you do it /missed/ say, in English. P/SOL/FOD/XPL/1/-/-/-

T: That has to do with corporation laws and copyrights on names and such, but two years ago when T/RES/FOD/XPL/2/-/-/- I was in Germany, I was, at the time, smoking Salem, and I noticed this pack of cigarettes one day, and I thought, "Oh, a pack of Salem." And then I looked again, and it was the identical package, the same green and white, the same kind of printing, but a different name. I wish I could think of the name now, but it is a Salem cigarette. But the way it's

APPENDIX C

TEST OF KNOWLEDGE OF INTERNATIONAL TRADE

NAME ______________________

SCHOOL ______________________

DATE ______________________

SECTION 1

Listed below are a number of terms commonly used by economists in discussions of international trade. You are to define each of these terms in two ways: (1) first, write a general definition of the term, giving the major ideas or characteristics to which the term refers; (2) second, give a specific example of the term. Even if you don't know an actual example of some of the terms, make up an example that is reasonable.

For example, suppose you were asked to define the term, "International trade". First, give a general definition, "Buying and selling of goods and services between two countries". Then, give a specific example, "The U.S. buys coffee from Brazil, and Brazil buys machinery from the U.S."

Remember, for each term, write a general definition and then give a specific example.

1. specialization
   general definition:

   specific example:

2. factors of production
   general definition:

   specific example:

3. exports
   general definition:

   specific example:

4. imports
   general definition:

   specific example:

5. foreign investment
   general definition:

   specific example:

6. tariff
   general definition:

   specific example:

7. quota
   general definition:

   specific example:

8. exchange control
   general definition:

   specific example:

9. export controls
   general definition:

   specific example:

10. rate of exchange
    general definition:

    specific example:

SECTION 2

Briefly answer each of the following questions. Simply write the main idea or the major points answering each question, without going into too much detail.

A sample question and the kind of answer required is presented below.

Question:	What is the fundamental reason for countries trading with each other?
Answer:	Because of the uneven distribution of factors of production, such as human skills, natural resources, and capital equipment.

1. In what important ways does international trade differ from domestic trade?

2. Explain why countries specialize in production of some goods and trade with other countries to obtain certain other goods they need rather than become totally self-sufficient.

3. How do the factors of production influence a country's productivity?

4. Why is the largest amount of international trade between highly industrialized countries?

5. How is the U.S. economy dependent on exports?

6. How is the U.S. economy dependent on imports?

7. What are the major reasons for direct foreign investment?

8. How does the trade between two countries influence the economy of each country?

9. What are the major reasons for a country maintaining barriers to international trade?

10. What are the major reasons for a country reducing barriers to international trade?

SECTION 3

Briefly answer each of the following questions. A sample question and the kind of answer required are presented below.

Question: The U.S. lacks industrial diamonds but produces large quantities of machinery. How does the U.S. obtain industrial diamonds?

Answer: Import diamonds from countries that produce diamonds and export machinery to countries that need machinery.

1. A heavily wooded country, such as Finland, concentrates on industries directly related to wood products and depends on imports from other countries for many other kinds of products she needs. Why doesn't Finland try to become more self-sufficient and produce the products she now has to import?

2. Even if India received huge sums of money and equipment for automobile factories, why would it still be difficult for her to put millions of unemployed people to work immediately producing automobiles?

3. Burmese farmers desperately need American farm equipment and other American goods. Yet, there is relatively little trade between Burma and the U.S. today. Why?

4. Why does our country have to export certain agricultural products such as wheat?

5. Although America is a land of coffee drinkers, why do we buy all our coffee from other countries instead of trying to grow our own coffee?

6. Why does General Motors have an automobile factory in Canada when it already has factories a few miles away in the United States?

7. If we cut down the amount of coffee we buy from Brazil, how does that affect Brazil's import of goods from us?

8. Suppose you were a Congressman arguing for an increase in the tariff imposed on bicycles imported from England. What would be the major reasons you'd use to support your argument? State these reasons in specific terms directly related to the manufacturing and importing of bicycles.

9. Suppose you were a Congressman arguing for a reduction in the tariff imposed on peanuts imported from Nigeria. What would be the major reasons you'd use to support your argument? State these reasons in specific terms directly related to growing and importing of peanuts.

10. Suppose the owner of a large supermarket in New York City was trying to decide on whether he should purchase olives from California or from Spain. Assuming the price of the olives delivered in New York was the same for both California and Spanish olives, and that the quality of the olives was the same, what kinds of problems would the owner of the supermarket have in purchasing the olives from Spain in contrast to purchasing them from California?

NOTE: On the examinations distributed to students, space was provided to answer each question directly on the test paper.

ATTITUDE SCALE

NAME ______________________________ DATE ______________

SCHOOL ________________________ GRADE __________ AGE __________

BOY GIRL (circle one)

What is your father's occupation? (or mother's if father not working)

____

Listed below are seven short paragraphs, each describing how a person might feel about studying ECONOMICS. Please read all the descriptions, and then check the paragraph that best describes how you feel about studying economics. Even if you've never studied economics in school and don't know exactly what it would be like, just give us your best guess. There is no right or wrong answer. We're interested only in your opinion, so check the paragraph that best describes how you feel about studying economics.

______ 1. Studying economics is of tremendous value, and I'd really enjoy it. It is one of the most important subjects I know, and everyone should be required to study it.

______ 2. Studying economics is very profitable for everyone who takes it. It is a worthwhile subject and most students should have the chance to study it.

______ 3. Studying economics would benefit a student. It deals with universal problems and teaches you to think accurately and efficiently.

______ 4. Studying economics is interesting. It is a useful subject that serves the needs of many students.

______ 5. Studying economics is all right. It has its merits and fulfills its purpose. I'd be willing to spend time studying this subject.

______ 6. Studying economics is not a bore. It has its merits and its drawbacks, but on the whole I think its merits probably somewhat outweigh its drawbacks.

______ 7. Studying economics won't do anybody any harm. I haven't any definite like or dislike for this subject. It might be worthwhile if it were taught right.

REVISED OCCUPATIONAL SCALE FOR RATING SOCIO-ECONOMIC CLASS

Level is used to denote socio-economic class level, from 1 to 7, in terms of the criteria as outlined at each level. The lettered categories, from A to G, are occupational groups, and are adapted from Edwards and Warner.

LEVEL 1

A. Professionals: high level; high responsibility; usually requiring post-graduate training, often at the doctoral level. All occupations which normally achieve this status level for their members. Examples: lawyers, physicians, dentists, engineers, judges, school superintendents, H.S. principals, airline captains, C.P.A.'s, Catholic priests, rabbis, Protestant clergy with Master's or Doctor's degree.

B. Semi-professionals: none

C. Proprietors, Managers, Business Officials: Ownership or management of business valued at $150,000 or more. When enterprise is national in scale or has a number of plants or large offices, then regional or divisional managers are top-level executives with great deal of responsibility, and high pay, and (usually) large number of subordinates.

D. Clerical, Sales: Clerical - none. Sales - sales managers would be in (C.) Top-notch salesmen (very high individual income) in securities, real estate, or life insurance.

E. Manual: none. Contractors are really in C, but if a contractor actually engages in manual work, then business value is used, and he is then dropped one level.

F. Protective and Service Workers: Protective - Police Commissioner, colonel and above in armed services. Service - none, except proprietors (c) or large service establishments.

G. Farmers: Value-acreage above $150,000. Gentlemen farmers, landowners who do not supervise directly operations on their property.

LEVEL 2

A. Professionals: these occupations requiring bachelor's degree, or (in some cases) master's. Professional nurses (college degree), teachers with degrees, F.B.I. agents, chiropodists, pharmacists, ministers with college degree, editors (except for large newspapers or magazines who are level 1), optometrists, graduate librarians, professional journalists, guidance counselors, accountants with bachelor's degree, social workers with M.A. (professional training)

B. Semi-professional: - undertakers, airline pilots.

C. Proprietors, Managers, Business Officials: Business values at 50 to 150,000 dollars. Sales managers, hotel managers, department managers of large businesses.

D. Clerical, Sales: Buyers or purchasing agents, life insurance salesmen, real estate sales.

E. Manual: none.

F. Protective and Service Workers: Captain or Major or equivalent, high police official.

G. Farmers: V.A. (value-acreage) $75 to $150,000... Owner - manages and supervises his property; rarely actively works on it. Employed - professionals and others in technical, advisory or administrative capacities.

LEVEL 3

A. Professionals: Social workers (B.A. or less, but no professional training or equivalency), teachers without degrees, R.N., librarians (non-professional training), ministers (non-college graduates), reporters on small or country newspapers, radio announcers (except networks, Level 2), county agricultural agents, laboratory technicians with B. A.

B. Semi-professionals: Clothes designers, commercial artists, architectural draftsmen, portrait or special (medical) photographers.

C. Proprietors, Managers, Business Officials: Business value $10,000 to $50,000. Minor officials of business such as office managers.

D. Clerical, Sales: Auto salesmen, administrative secretaries, accountants or auditors (non-degree).

E. Manual: none.

F. Protective and Service Workers: Protective: detectives, Lieutenant in Regular Army. Service: Superintendent of buildings and grounds.

G. Farmers: $50,000 to $75,000 V-A. Owners: actively operates own land with one or more "hired hands", and seasonal help. Tenants: operates leased property. Employed: managers and supervisors on large property; have general responsibility for operation.

LEVEL 4

A. Professionals: none

B. Semi-professionals: Undertakers' assistants (trained), lab. technician (2 years training typical), dental hygienist, draftsman, engineering aide, optician (perhaps manual), photographer, fingerprint technician.

C. Proprietors, Managers, Business Officials: Business value $5,000 to $10,000. There are really no business officials at this level: they are either managers or clerical, sales.

D. Clerical, Sales: Clerical: General bookkeeper, stenographer and secretary, bank teller, payroll agent, cashier, individual insurance collection agent, RR ticket agent. Sales: traveling salesman (soft goods), assistant buyer, furniture salesman (inside)

E. Manual: Must be highly skilled, equivalent to formal apprenticeship and/or self-employment, or responsibility -- radio and TV repairmen, master plumbers and electricians, maintenance electrician for a large plant, watchmaker, machinist, tool and dye maker, printer, factory foreman, trained airplane mechanic (engines), carpentry contractor who also works on jobs.

F. Protective and Service Workers: Protective: policemen and firemen. Service: RR conductors, fancy cake bakers, chef in large restaurant, custodial "engineer" in public building, dressmaker (?), custom tailor, dry cleaning expert.

G. Farmers: V-A $30,000 to $50,000. Owners--operate own property with family and/or seasonal help. Tenants-operate rented property with one or more "hired hands". Employed-foremen on large properties.

LEVEL 5

A. Professionals - or B. Semi-professionals - or C. Proprietors, Managers, Business Officials - NONE

D. Clerical, Sales: Clerical - timekeepers, assistant bookkeepers, typists, telephone operators, postal clerks. Sales - store clerks, salespersons, usually soft goods or portable goods.

E. Manual: skilled at journeyman's level - carpenter or carpenter rough, construction electrician, telephone or telegraph lineman, automobile mechanic (engines). Factory - certain assembly and inspection jobs requiring considerable responsibility and training.

F. Protective and Service Workers: Protective: Corporal or Sergeant in Regular Army. Service: barber, hair stylist, baker, cook, practical nurse, tailor, butcher, mail carrier, bus driver, waiter at fine restaurant.

G. Farmers: V-A $15,000 to $30,000. Owners - operate own property and "hire out" to supplement income, but only in farm work. Tenants: operate rented property without paid help other than seasonal. Employed: farm foremen.

LEVEL 6

A. or B. or C. - NONE

D. Clerical, Sales: Dime-store clerks, shipping clerks, stock clerks, mail clerks, checkers at A & P, office boys, (bonded messengers ?).

E. Manual: semi-skilled to low-skilled factory work - requiring relatively little training or experience - typical assembly line or operative work. In construction or other trades, helpers to skilled craftsmen. Heavy labor if regular and stable, including miners.

F. Protective and Service Workers: Protective: Soldier, general duty; night policeman; Service: bartender, waiter, short-order cook or counter man, manicurist, chauffeur, truckdriver, taxi driver, gas-station attendant, shoe-repairman, janitor (not porter) butcher's helper, hospital attendant, longshoreman if regular employment, elevator operator (?).

F. Farmers: V-A $5,000 to $15,000. Owners - None Tenants - who supplement income by "working out". Sharecroppers. Employed - established farm laborers.

LEVEL 7

A. or B. or C. or D. - NONE

E. Manual: heavy labor not regular or stable; migratory labor (non-farm); odd-job men.

F. Protective and Service Workers: Night watchmen, porters, garbage collectors, charwomen, messengers or delivery boys.

G. Farmers - V-A $5,000 and below. Owners - none. Tenants - "squatters" or "nesters" and other non-paying tenants. Employed - migrant and seasonal workers.